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The cost of job displacement in Italy

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Abstract

Administrative data from INPS (Italian Institute for Social Security) on Italian high tenure workers job-histories (15 years, from 1985 to 1999) is used to quantify the temporal pattern of the effect of displacement on workers' earnings, employment and wages. Moreover, I distinguish different groups of displaced workers (with respect the timing of displacement and its cause) and I also propose a picture of the consequences of displacement with respect to workers' personal and firm-related characteristics. I take into account unobserved heterogeneity by using an unobserved effects linear panel data model. (JEL J65*)*

Keywords: Displacements, mass-layoffs, earnings, employment, wages.

I. Introduction

The vast research on U.S. economy has showed that[1] displaced workers are likely to suffer long-term earnings losses due to their job loss. As an example, Stevens (1997), in a national sample of

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[1] For deeper reviews of the empirical literature on the U.S.A., see for example: the introduction (K.F.Butcher-K.F.Hallok, 2005) to the proceedings of the Federal Reserve Bank of Chicago Conference "Job Loss: Causes, Consequences, and Policy Responses"; Kletzer (1998); Fallick (1996).

experienced displaced workers from the Panel Study on Income Dynamics, estimated large and persistent earnings and wage losses: annual earnings fall approximately 25 percent in the year prior to job displacement and approximately 28 percent in the year of displacement with respect expected earnings of non-displaced workers. One year after displacement they remain 15 percent below expected levels and in the subsequent years losses are highly variable, ranging from losses of about 3 to 12 percentage points, and show no clear tendency of fading away. These findings are qualitatively very similar to those obtained for a sample of Pennsylvanian workers by Jacobson, LaLonde and Sullivan (1993) (JLS), which can probably be considered the seminal paper in this field of empirical labor-market analysis.

Also, displaced workers experience more non-employment than do non-displaced workers. However, if the earning and wage losses tend to be rather permanent, the difference in non-employment spells tends to fade away in the long-medium run (Ruhm 1991, Fallick 1996).

A lot less has been done for Europe, and especially for Italy. The main problem that have made things difficult is the lack of adequate data, especially of long panels that could permit to take into account unobserved heterogeneity. Burda and Mertens (2001) founds that in Germany full-time men displaced workers suffer, in the year following displacement, a reduction of wage growth of 3.6% with respect to a reference group of continuously employed workers. Leonard and Audenrode (1995) analyze the cost of job loss for a sample of Belgian employees and estimate that wage losses upon re-employment are nearly zero. Likewise, Ackum (1991) finds no significant earnings loss in Sweden. Pichelmann and Riedel (1993) uncover wage losses for Austrian workers only in the short term. J.H. Abbring et al. (1999) don't find much evidence of wage losses due to displacement in Netherlands. With respect Italy, Contini et al. (2006) compare (through cross-section OLS estimates) the wage growth of displaced workers to that of stayers for the period 1986-1991. They use INPS panel and do find that displaced workers experience a lower wage growth.

Earnings, wages and employment outcomes of displaced workers may be expected to be worse than what they could have been if they had not been displaced for various reasons. Firstly, displaced workers could loose sectoral/firm specific skills they have accumulated or simply particularly good job matches. Secondly, there is the possibility that they lose industrial or union wage premiums or efficiency wages. Thirdly, the functioning of internal labor markets (promotion from within policies) or incentive pay mechanisms in the lost job can determine the impossibility of benefiting

of the future expected wage growth. Therefore a temporary worsening of the labor market outcomes of displaced workers, although relevant, is something physiologic and in conformity with the expected dynamics of the labor market. However, the persistence of the negative consequences of displacement even in the long run could be more disturbing as it is a signal that displaced workers, and maybe the whole economy, have permanently loss some earnings potential. Such considerations could stimulate interest in providing appropriate assistance and training policies for displaced workers. Hence, studying how the degree of persistence of such losses vary between workers with different characteristics can give some hints in targeting and designing such policies. More in general, given that the typically adopted definition of displacement usually implies a structural cause for it (Fallick 1996), studying the effects of displacement on workers could provide microeconomic evidence on how the labor market reacts to structural changes, such as a sectoral reallocation of production and employment.

In this paper, I use administrative data from INPS (Italian Institute for Social Security) on Italian high tenure workers job-histories (15 years, from 1985 to 1999) to quantify the temporal pattern of the supposed negative effect of displacement on workers' earnings, employment and wages. Moreover, I distinguish different groups of displaced workers (with respect the timing of displacement and its cause) and I propose also a picture of the such losses with respect to workers' personal and firm-related characteristics. I take into account unobserved heterogeneity by using an unobserved effects linear panel data model. The sample selection and econometric modeling choices will conservatively follow JLS' strategies for two main motivations: to assure comparability of Italian results with the accumulated international evidence (on the consequences of displacement) and because of the source of this data is, as in the JLS' study, administrative.

In Section II I will describe the INPS-panel and define the groups of displaced workers we will analyze and the comparison group. In Section III I will lay out the econometric model and consider some potential sources of bias. In Section IV I will comment the estimation results. Section V contains some concluding summarizing remarks.

II. Data

Data comes from the INPS (*Italian Institute for Social Security*) administrative recordings for the period 1895-1999. It is a random sample of workers employed in the private-dependent sector of the Italian economy. I have data on the calendar beginning and closing dates and on the duration (number of weeks) for each employment-relationship. However it is not possible to consistently recover the quarterly or monthly temporal pattern of earnings or weeks in employment because for each employment-relationship we only observe the annual number of weeks in employment and the annual earnings without additional information on their temporal distribution. I have information on individuals (age, sex, place of birth, place of work, type of occupation) and on the firms (number of employees, date of birth and of death, sector) where they are employed. The structure of the panel is such that I can observe the main characteristics of both employees and firms, but I cannot observe all the employees belonging to a single firm. Therefore, I only observe the characteristics of a firm to the extent that some worker present in our sample is employed in it. The dependent variables of interest are weekly real wages, the number of weeks worked in a year and annual real earnings. It is also important to understand that annual earnings, besides the annual compensation for the actually worked weeks, also contains: 1) repayments for accumulated vacations 2) back-payments due to law or contract 3) annual bonuses as the "tredicesima" 4) CIG's and CIGS' compensations[2]. To take into account this fact and the possibility that workers hold multiple jobs in a given year, I will consider two different real weekly wage variables. The first wage variable, defined *aggregate weighted weekly wage* (*aww*), is the average of real weekly earnings from all sources weighted by the number of weeks worked in the particular job.

The second wage variable is aimed to take into account the fact that during the year of mobility the earnings of the mover at the old job could be inflated by some of its components that are traditionally higher during the last year of employment in a particular firm: repayments for accumulated vacations and back-payments due to law or contract. Moreover, the importance of these components is positively correlated with the tenure of the worker at the left firm (and, as I will explain, the movers contained in the retained sample have at least seven years of tenure). A feasible

[2] See appendix, section A.4

strategy is to exclude, during the year of mobility, from the weighted weekly wage variable of movers the weekly earnings from the left firm (if and only if during such year the worker resulted successively employed in a different firm). The resulting wage variable is called *aggregate adjusted weighted weekly wage* (*aaww*).

Workers of the construction sector are excluded due to the high seasonality of their jobs. Besides, I will keep out from the sample also workers that experienced displacement or change job before or during year 1991 and part-time workers before or during 1991[3]. The real earnings and real wages are expressed at 1995 prices using the IPC ("*Indice dei prezzi al consumo*") index provided by ISTAT (Italian Institute of Statistics). Since workers may hold more than one job in a given year, we will compare our estimates for the main job-earnings and worked weeks with other estimates that take into account all jobs that are held during the year. The main job is defined according to the number of weeks worked and, in case of ties, the main job is the one that provided the highest earnings during the particular year. During the year of displacement (or of mobility), the main job is the job held in the downsized or closed firm (or in the left firm). I expect that using as dependent variable only the earnings or the worked weeks of the main job in a given year (defined as *main job earnings* and *main-job worked weeks*) instead of the *aggregate annual earnings or the aggregate worked weeks* will give higher estimated displacement costs if displaced workers are more likely to hold multiple positions in a given year than non-displaced workers.

The sample of displaced workers will be formed by employees of firms that closed their activity (in the year of closing or in the previous year) or experienced a significant reduction in the number of employees (at least -40%) during the year of the "observed separation". We will initially differentiate between four groups of displaced workers: those displaced from closing firms during the year of firm-closure (defined *ultimately displaced workers*); separators from closing firms during the year preceding firm-closure (defined *pre-closing separators*); those separated from firms that during the same year experienced a significant reduction (40% or more) in the number of employees (defined *mass-layoffs*). The workers belonging to the first group cannot be clearly contained also in the second group, but they are all contained in the third group. Therefore, to

[3] To account for the heterogeneity of post-separation paths we prefer not to erase this possible post separation outcome.

understand better the difference between the consequences of displacement due to plant-closure and those due to mass-layoffs without plant-closure, I will form a fourth group: workers that were exposed only to a mass layoff that is not linked to a firm-closure (defined *only-mass-layoffs*). [4] However, in practice, we are not sure that all pre-closure separators left their firms for a reason connected with the impending closure. The only information I have to evince if a certain separation can be considered a displacement is the evolution of the number of employees in the firm during the year preceding the closure. Therefore, I will include a worker that leaved his firm in the year preceding its closure in the pre-closing separators group if and only if during this year there was a net reduction in the number of employees. In many studies the common practice is to assume that the closing process lasts one year; however some studies have begun to criticize this assumption and to identify displaced workers using a window longer than one year. Bender, Dustmann, Margolis and Meghir (2002) consider firm closure a two year process without taking into consideration employees flows. Eliason and Storrie (2003) additionally analyze employees flows to understand the duration of the closing processes and, finally, consider firm closure a two year process.

I will compare these workers to a *control group* formed by workers that didn't experience a mass layoff or a firm-closure (or a pre-closure separation) along all the sample period. I think this is a better choice than that of using only workers that additionally maintain their initial jobs for all the years under scrutiny (or that don't experience periods of non-employment), because the comparison group is aimed to be representative of the counterfactual situation of displacement. Therefore, the control group should represent the hypothetical (and not observed) outcomes of the *same displaced workers* if they simply didn't experience the involuntary job loss, without additionally (and arbitrarily) ruling out that they would experience a job change (or non-employment). However, it is also important to point out that the control group described above could be exposed to the inclusion of individuals that were laid off on an individual basis[5], that I cannot take into account due to the

[4] My definitions of displaced workers conforms with those prevalently used in the literature. However, still few studies distinguish contemporaneously between these groups. See for example: Kriechel and Hamermesh, 2001; Lengermann and Vilhuber, 2002; Schwerdt, 2005.

[5] In a paper in which they develop a asymmetric-information model of layoff, Gibbons and Katz (1991) find evidence that workers displaced on an individual basis fare worse than workers displaced in a plant closing. The theoretical explanation is connected to a "lemons" effect by which individual lay-offs function as adverse signals about the workers' productivity. On the other hand, it could also be that local labor markets are affected by the inflow of

administrative nature of the data. In any case, the estimates I will provide in this paper are not sensitive to exclusion from the control group of the employees whose separations are not related to mass-layoffs or firm closures (defined *other movers*). Moreover, in the Italian case, mass-layoffs and/or job losses due to firm closure can probably be considered more representative of the whole population of high tenure displaced workers than it happens for less stringent EPL countries, as for example in the U.S. case, where individual layoffs of high tenure workers are, given the lower firing costs and legal restrictions, presumably more common.

As a final sample restriction, that is valid for the control group and for all the other groups of movers, I will consider only workers that in 1991 have at least seven years of tenure (or more, given that tenure for the majority of workers is censored at year 1985) with their current firm. This choice is made firstly to guarantee comparability with the other international studies and, secondly, because high-tenure workers are the most likely to suffer from job-displacement as they have higher probability to have accumulated firm (or sector) specific human capital and/or to maintain their jobs simply because of they are particularly good matches. Internal labor markets (promotion from within policies) and incentive pay mechanisms are other two sources of earnings losses that increase their effects with tenure.

The main drawback of INPS panel is that workers that result non-employed in the private-dependent sector could have found other jobs via self-employment or working in the Agricultural or Public sectors. Moreover there is also the possibility that workers simply retired or end up in the shadow economy. Therefore, if other movers earn more than displaced workers outside private dependent sectors, imputing zero earnings to all persons that result non-employed in the private dependent sectors would imply understating displaced workers' losses. For example, it could be that other movers are more likely than displaced workers to be employed out of the private dependent sectors. However, I have additional administrative data ("Self-employment" archives, "Pensions" archives and "Quasi-dependent" archives) about retirement, self-employment and quasi-dependent employment (i.e., atypical labor contracts). Even if it is impossible to reconstruct workers earnings

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relatively similar job seekers deriving from a firm-closure. If the "lemons" explanation of Gibbons and Katz and/or the "local labor market" hypothesis were applicable to the Italian labor market, the samples of displaced workers considered above could not be taken as representative of the whole population of displaced workers, as it happens for all the studies that are based on administrative data. Survey based data don't have this kind of disadvantage, but they have the problem of relying on workers' (or firms') self reported reasons for why a separation occurred.

outside the private dependent sectors (apart from pensions, there is no relevant information about earnings deriving from self-employment and quasi-dependent employment), this additional information will be useful to understand the possible outcomes of workers that leave INPS sample. JLS faced the same problem with their administrative data on Pennsylvanian workers. They decided to set the sample restriction that workers have positive earnings during all years and, as a consequence, they eliminated about 40% of their sample of high tenure displaced workers. In this paper I will follow the same approach. This sample restriction, in this case, eliminated about 50% of high tenure displaced workers. A large majority of these workers (about 70%) never had any positive reported earnings after their job losses. Because the probability to be non-employed is likely to be higher for displaced workers (that disappear from the panel) than for simply movers (that disappear from the panel), I think that this sample restriction biases downward the estimated losses due to displacement[6].

Table 1 reports workers' characteristics in the year-job of mobility (for the following groups: ultimately displaced, mass-layoffs, only mass-layoffs, pre-closing separators and other movers) or during the last eight years covered by the sample (for the control group)[7]. The descriptive information correspond to the main-jobs characteristics.

I include only the first observed job displacement for each individual during the relevant period. I do not separately include additional displacements for these workers because, as common in the literature, I consider future displacements as a cost of the initial displacement[8].

The last group of workers that appears in the table, defined *other movers*, is formed by persons that change job for reasons not related to mass-layoffs or plant-closures. These residual movers could be either simple quitters or additional displaced workers (i.e., persons fired individually I have mentioned above).

[6] See appendix A.5

[7] Given that I consider displacement (or mobility) only if it happens after 1991, I made this choice to assure the comparability of all the groups.

[8] The analysis of the consequences of multiple displacements on earnings losses in Italy is left to future work. However, preliminary results show that, as expected, workers subject to multiple displacement fare worst. See Stevens (1997) for this kind of analysis applied to U.S. data.

Workers Characteristics		Ultimately displaced	Mass layoffs	Only Mass layoffs	Pre-closing separators	Control group	Other Movers
Age categories	20-29	11%	10%	7%	2%	4%	5%
	30-39	40%	41%	44%	41%	31%	31%
	40-49	39%	39%	39%	52%	47%	47%
	>49	10%	10%	10%	5%	18%	17%
Median age		39	39	39	40	43	43
Mean age		39.4	39.5	39.7	40.2	42.6	42.3
Occupation	blue collars	66%	68%	72%	41%	55%	51%
	white collars	34%	32%	28%	59%	45%	49%
Sex	male	62%	64%	67%	80%	74%	80%
	female	38%	36%	33%	20%	26%	20%
Industry	manufacturing	64%	65%	68%	87%	70%	77%
	services	36%	35%	32%	13%	30%	23%
Location	North	66%	64%	63%	68%	62%	61%
	Center	18%	18%	17%	9%	20%	21%
	South-Islands	16%	18%	20%	23%	18%	18%
Number of observations		596	759	163	46	69,984	2,442
Average annual aggregate earnings		16,576	16,550	16,453	21,902	21,320	22,113
Average annual main-job earnings		15,913	15,955	16,111	21,747	21,223	21,777
Main as % of aggregate earnings		96.0	96.4	97.9	99.3	99.5	98.5
Average annual aggregate worked weeks		49.0	48.9	48.4	50.1	50.6	50.6
Average annual main-job worked earnings		47.1	47.2	47.4	49.7	50.4	49.8
Main as % of aggregate worked weeks		96.1	96.5	97.9	99.2	99.6	98.4
Aggregate weighted weekly wage		341	340	337	433	421	435
Aggregate adjusted weighted weekly wage		335	334	333	431	420	432

Table 1. **Descriptive statistics**.

Given that the number of workers displaced during a mass layoff not followed by the closure of the firm is relatively small, the figures of table 1 don't reveal relevant dissimilarities between the characteristics of the workers belonging to the ultimately displaced and mass-layoffs groups. However, with respect to the control group, these groups have higher percentages of female workers and of blue-collars. Moreover, as the groups of pre-closing separators and of only mass-layoffs, ultimately displaced workers and mass-layoffs tend to be younger than never displaced workers and other movers. With respect the other characteristics displayed in table the differences are minor. The more relevant peculiarities of the only-mass-layoffs with respect ultimately displaced workers are higher percentages of blue collars, of men and of manufacturing workers. Moreover, other less

quantitatively relevant differences that characterize only-mass-layoffs with respect ultimately displaced workers are the location (the only-mass-layoffs group have a greater percentage of workers located in the south) and the age (only-mass-layoffs tend to be older).
Workers that separates the year preceding the closure of their firm (pre-closing separators) are characterized by the highest percentages of workers located in the north, of workers belonging to the age group "40-49", of workers employed in the manufacturing sectors, of white-collars and of men (with respect all the other groups). The characteristics of other movers tend to be similar to those of the control group. However, other movers tend to be younger and to have a higher percentages of white collars, of men and of workers belonging to the manufacturing (with respect to those of the control group).

Table 1 also reports the average real annual earnings, real weekly wages and worked weeks of the various groups for the fifteen years covered by the sample. Other movers have the highest average annual earnings and weekly wages and they are followed by: pre-closing separators, control group, ultimately displaced, mass-layoffs and only-mass-layoffs. Looking at the difference between average annual aggregate earnings and average annual main-job earnings it appears that pre-closing separators, other movers and the workers belonging to the control group are more attached to the main job and/or have less needs to integrate the main job earnings with respect the other groups of displaced workers. As expected, the difference between the values of these two earnings variables seems especially relevant for the first three groups of displaced workers.

With respect to average annual aggregate worked weeks, the best performing groups are the control group and other movers, that are followed by: pre-closing separators, ultimately displaced workers, mass-layoffs and only-mass-layoffs. This is not surprising given the fact that the control group contain also workers that never changed job during 1985-1999 and that displaced workers are likely to experience non-employment as a consequence of displacement (at least in the short run). Looking at the difference between average annual aggregate worked weeks and average annual main-job worked weeks it is confirmed, also in terms of worked weeks, that pre-closing separators, other movers and the workers belonging to the control group are more attached to the main job and/or have less needs to integrate the main job earnings with respect the other groups of displaced workers.

The last two rows of Table 1 show the real weekly weighted wages. As for earnings and worked weeks, the last three groups (control group, other movers and pre-closing separators) appear better-off with respect the other groups of workers (ultimately displaced workers, mass-layoffs and only mass-layoffs). Moreover, as expected, *aaww* are lower than *aww* for all the groups.

Summing up, these simple descriptive statistics show that, for high tenure Italian workers, job displacement is more common among women, unskilled workers and younger workers.[9] Moreover, it appears that workers belonging to the control group, other movers and pre-closing separators differ from workers belonging to the other groups of displaced workers more in terms of wages than in terms of worked weeks.

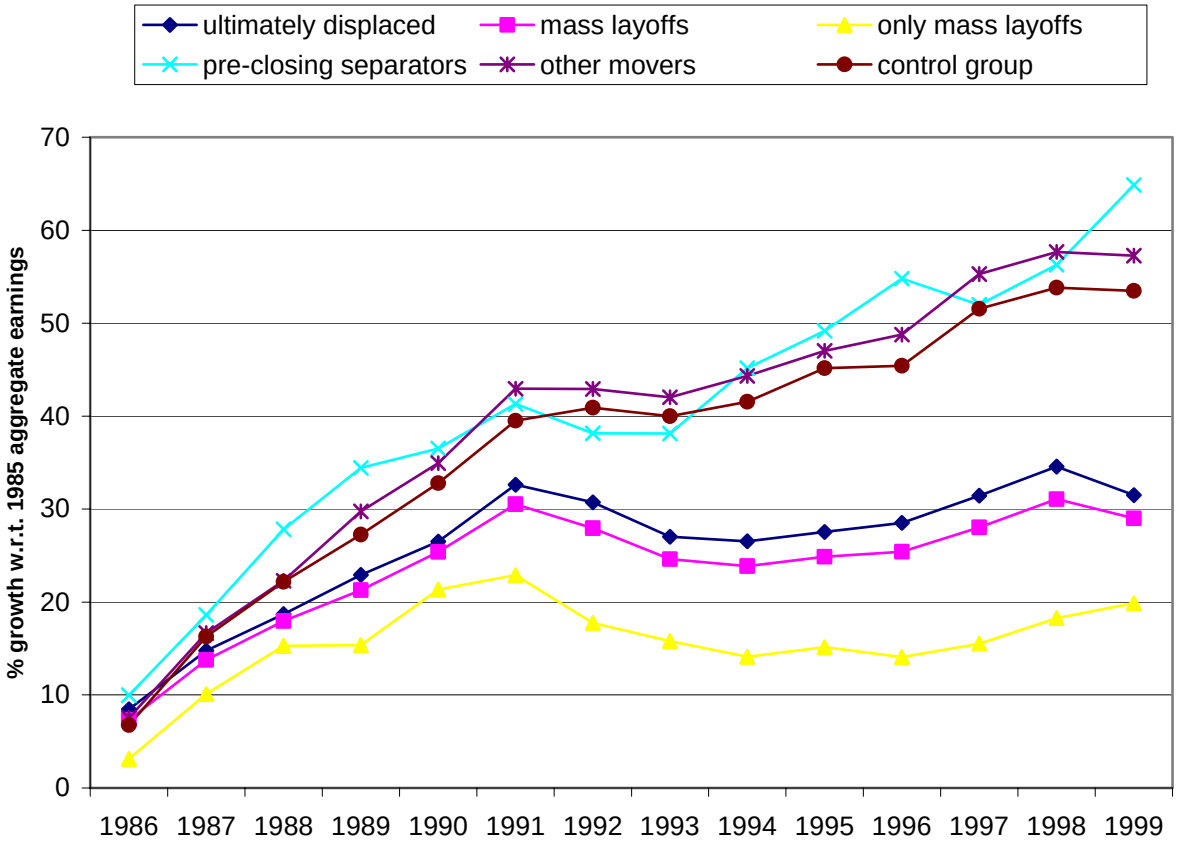

Figure 1. Real aggregate earnings percentage growth (reference year 1985).

[9] This evidence, with the exception of the finding about the gender dimension, conforms with non Italian patterns in the incidence of job displacement. See for example Kuhn et al. (2002), Fallick (1996) and Kletzer (1998). In a companion paper, I will provide more accurate estimates of the incidence of job displacement in Italy without limiting the analysis to high tenure workers and considering all individual displacements (not only the first one as in this case) and using regression analysis.

Let's now have a preliminary look at the crude evidence about aggregate earnings dynamics (during the period 1985-1999) for the groups of workers we have formed and which, in the next sections, will be object of a more rigorous analysis. Figure 1 depicts the real aggregate earnings percentage growth (with respect 1985 real aggregate earnings) for the groups in which I have divided this random sample of high tenure workers.

The dynamics of real aggregate earnings for the control group reflects the very favourable Italian macroeconomic conditions between 1985 and 1991 (in this period Italian economy grew with an average annual real GDP growth of about 2.5%) and the subsequent slowdown during 1992-1993. During 1994-1995 real aggregate earnings and real Italian GDP begin another time to grow; they suddenly stops their ascending trajectory in 1996; they return to the pre-1992 growth-performance only during 1997 and then start a more moderate growth period.

Figure 1 shows that in the pre-mobility period (1985-1991) all groups of workers, with the exception of pre-closing separators and only mass-layoffs, display similar real aggregate earnings growth-paths. However, it is also evident that the difference between the growth paths of, on one side, other movers and control group workers and of, on the other side, mass-layoffs and ultimately displaced, widens as the mobility period (1992-1999) approaches. This phenomenon could be due to the fact that the events that lead to workers' displacements, i.e. the bad economic situations of their firms, negatively influence workers' earnings. The growth path of the workers belonging to the only mass-layoffs group appears instead very different from those of the other groups from the beginning. Pre-closing separators' earnings dynamics resembles those of other movers and of the control group. However, during the in the pre-mobility period (1985-1991), they tend to be relatively better-off.

During the mobility period (1992-1999) the difference between the earnings growth paths of, on one side, other movers, control group workers and pre-closing separators, and of, on the other side, mass-layoffs, ultimately displaced workers and only mass-layoffs enlarges: this preliminary descriptive statistics suggests that displaced workers, with the important exception of pre-closing

separators, do loose in term of earnings with respect to the control group. Pre-closing separators and only-mass-layoffs groups are (on average), respectively, the best and the worst performing groups[10].

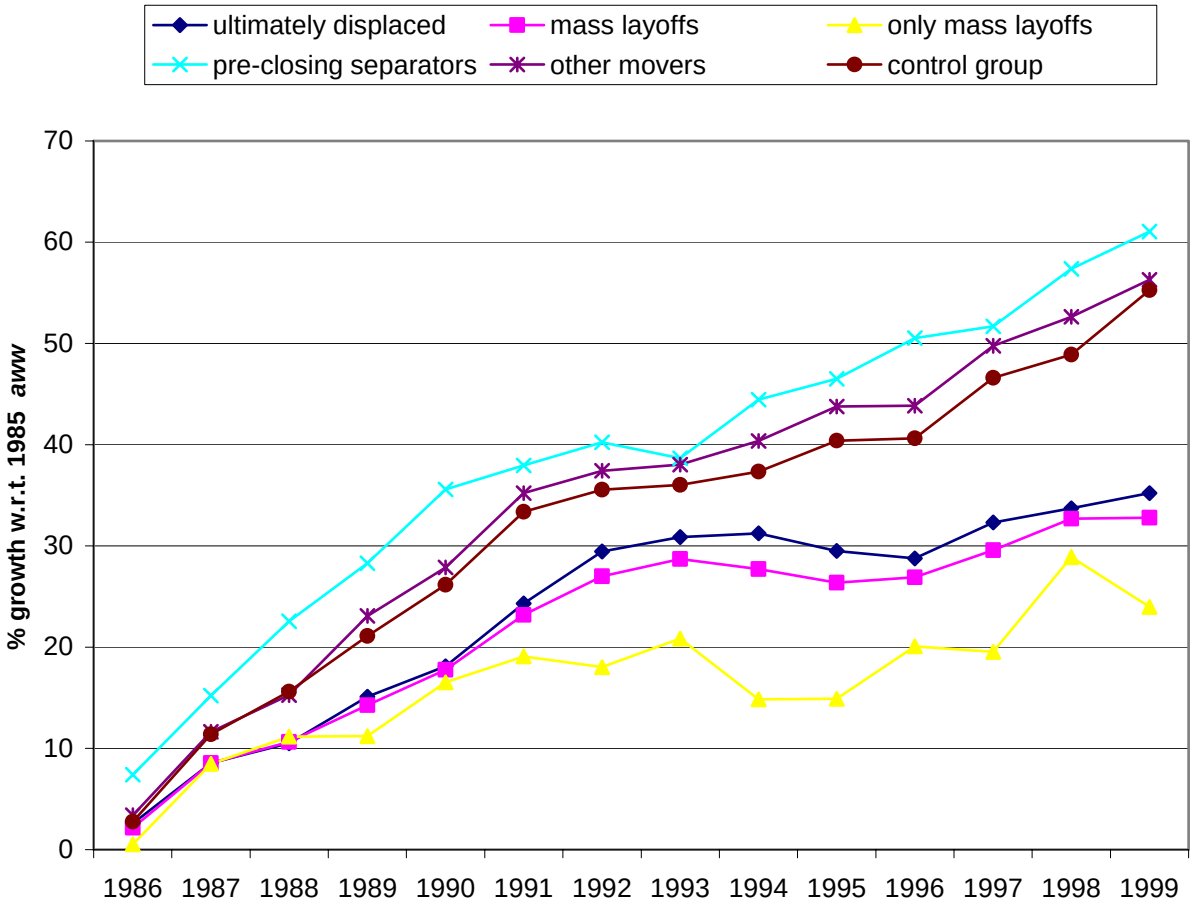

Figure 2. Real weekly wage percentage growth (reference year 1985).

Figure 2 shows that during the first three years (1986-1988) all groups of workers, with the exception of pre-closing separators, display very similar real weekly wage growth-paths. The difference between the growth paths of, on one side, other movers and control group workers and of, on the other side, mass-layoffs, only mass-layoffs and ultimately displaced, widens as the mobility period (1992-1999) approaches. Another time, this phenomenon could be due to the fact that the events that lead to workers' displacements, i.e. the bad economic situations of their firms,

[10] Tentative explanations to these phenomenon together with its implications for the consistency of the estimates of the earnings losses due to displacement will be given in the next paragraph.

negatively influence workers' wages. The growth paths of pre-closing separators appear instead very different from those of the other groups (especially from the other groups of displaced workers) from the beginning.

During the mobility period (1992-1999) the difference between the wage growth paths of, on one side, other movers, control group workers and pre-closing separators, and of, on the other side, mass-layoffs, ultimately displaced workers and only mass-layoffs tend to be larger and increasing[11]. Also this preliminary descriptive statistics about wages suggests that displaced workers, with the important exception of pre-closing separators, do loose with respect to the control group. As it happened for earnings, pre-closing separators and only-mass-layoffs groups are, respectively, the best and the worst performing groups[12].

In conclusion, it is important to underline two points that emerge from this descriptive statistics. This preliminary analysis suggests that the labor market characteristics (that we have observed in table 1, figure 1 and figure 2) of pre-closing separators are very different from those of ultimately displaced workers and that it is necessary to account for this fact if we really want to understand the consequences of firm closures on workers. The pre-closing separators group is relatively more skilled and have relatively greater percentages of men, of manufacturing workers and of older workers. Moreover, with respect to wage and earnings dynamics, pre-closing separators are relatively better-off. Another important preliminary finding is related to the discrepancy between the characteristics of only-mass-layoffs and those of ultimately displaced workers: workers displaced due to firm closure appear to be different from workers displaced during a mass-layoff not connected to a firm closure. The only-mass-layoffs group is comparatively less skilled and have greater percentages of men, of manufacturing workers and of older workers. Moreover, with respect to wage and earnings dynamics, only-mass-layoffs separators are relatively worse-off.

[11] However, we can also notice that during the slowdown period (1992-1993) the wage growth paths of the various groups tend to be more compressed.

[12] Tentative explanations to these phenomenon together with its implications for the consistency of the estimates of the wage losses due to displacement will be given in the next paragraph.

III. Econometric model

We will use data of workers that are displaced at some point in the sample ($D^0_{i,s}$ = 1) and data about the comparison group of workers that have never been displaced in the sample period ($D^0_{i,v} = 0 \ \forall \ v$) to estimate by first differencing (FD) the following linear unobserved effects model:

(1) $Y_{it} = X_{it}\beta + \sum_{K\geq -g}^{f} D^K_{it}\delta_K + \alpha_i + \gamma_t + u_{it}$; assuming:

A .1: $E\left(u_{i,t} \mid \psi_{i,1},...,\psi_{i,T},\alpha_i\right) = 0$, $t = 1,...,T$

A .2: $rank\ [\sum_{t=2}^{T} E(\Delta\psi'_{i,t}\,\Delta\psi_{i,t})] = Q$.

Where:

- Q is the number of regressors.
- $\psi_{i,t}$ is a vector containing all the regressors for individual i at time t , but the individual specific α_i .
- $\Delta\psi_{i,t}$ is a vector containing the individually first-differenced regressors.
- Y_{it} is the log of the relevant dependent variable.
- The set of dummy variables $D^K_{i,t}$ represents the occurrence of the event of displacement; in particular δ^K is the effect of displacement on workers' or earnings K years following (or, if K is negative, prior to) its occurrence. These coefficients, multiplied by one hundred, approximate[13] the percentage losses of displaced workers (belonging to the different groups we will take into account) in term of annual earnings (or weekly wages or worked weeks) with respect to the expected earnings (or weekly wages or worked weeks) of never-displaced workers belonging to the control group.
- X_{it} is a vector of time varying factors, taken alone and interacted, influencing the worker's basic exogenous earnings potential (sex, age, age squared and interactions) that cannot be influenced by the *treatment* (i.e., displacement). Given the fact that only age is not constant over

[13] The exact percentage effect on earnings is calculated using the estimates of the relevant coefficients as: $e^{\delta^K} - 1$.

time and that we will employ the FD estimation technique, we will have that only age-terms and age-interacted terms remain in *X*. Though I don't have data on educational attainment, by using the model (1) I will take it into account to the extent that this unobserved heterogeneity is time-invariant. Other factors that may change over time also as a result of displacement, such as those related to the firm/industry of the worker, the experience/tenure dimensions or to the blue/white collar type of occupation of the worker, are not included in X_{it} in order to pick up the full "unconditional" effect of displacement. More importantly, if we include in X_{it} information about *non-ignorable*[14] workers' characteristics that could vary as a consequence of displacement, we would depart from the needed strict exogeneity assumption A.1 that is a necessary condition for consistency. To clarify the matter, let's imagine a two period example in which the sector of occupation of the worker (defined S_{it}) is an observable non-ignorable time-varying characteristic. A worker is displaced at time 1 ($D^1_{i,2}=1; D^0_{i,1}=1$) and, as a consequence of it, change her type of occupation at time 2. Reframing assumption A.1 in terms of conditional expected earnings and adapting it to this example, what we have argued can be expressed by the following inequality: $E(Y_{i,2}|D^1_{i,2}=1, D^0_{i,1}=1, S_{i,1}, S_{i,2}, \alpha_i) \neq E(Y_{i,2}|D^1_{i,2}=1, D^0_{i,1}=1, S_{i,2}, \alpha_i)$. For our hypothesized worker displaced at time 1 that, at time 2, is forced to change sector by the event of displacement, it is clear that knowing the previous sector of occupation is for sure an additional significant information: comparing the time 2 sector with the time 1 sector gives us additional relevant information about the conditional expected earnings at time 2. Therefore, we choose not to insert in X_{it} time varying factors that can be influenced by displacement.

- The γ_t's are the coefficients of calendar year dummy variables that are aimed to control for the general time pattern of or earnings in the whole economy.
- α_i is a time-invariant individual fixed effect that is meant to control for unobserved time-constant workers' characteristics that could influence their earnings[15].

[14] A non-ignorable characteristic is a characteristic that is correlated with the dependent variable.

[15] I have also tried another specification, a random growth model, i.e. I have added to the independent variables of the basic model (1) individual specific time trends that should control for unobserved heterogeneity that could influence workers' rate of earnings growth. I have estimated this model by first differencing (to eliminate the additive effect α_i) and then using the within transformation to eliminate the random trend. However the estimated coefficients resulted

- Choosing g means imposing that there are no effects of displacement from g years before displacement backwards. Therefore, we expect that, if we have carefully controlled for all the non-ignorable observables and non-observables variables influencing differences in the relevant dependent variables between the control and the treated groups, the parameter δ_K at K = -g will not be significantly different from zero. Consequently, estimates of the displacement effect during the pre-separation years may be used as an informal specification test of the model. I have set $g = f = 7$.

In general, bias in the model could occur if the groups of displaced workers are not random samples in terms of non-ignorable (observable and unobservable) characteristics we don't control for (i.e., observable time-varying characteristic not contained in X_{it} and unobservable time-varying characteristics). Therefore, finding relevant and persistent displacement effects during all the years preceding displacement could signal that also (or only) other factors, different from displacement, are determining such losses, i.e. a causal interpretation of the estimated δ^K is not warranted.

A first source of bias could arise if firms tend to lay-off selectively workers whose performance was poor in the year(s) before separation (defined *selected lay-offs hypothesis*). In terms of our model this would imply a correlation between the dummies indicating a mass-layoff (and/or a pre-closure separation) and the error term. Therefore, the importance of the consequential biases would depend on the time series properties of the error[16].

Moreover, if workers have information on the future closure of their firm, another process of selection could take place. Workers will probably try to find another job and, consequently, separations registered in the year before firm-closure could be pre-emptive quits. One could suspect that those who succeed in that search process will tend to have comparatively "better" labor market characteristics (as an example they could simply have more job-search ability or better labor market connections) than those remaining till the "bitter end" and therefore that they will be affected comparatively less by the closure of the firm. Comparing estimated wage losses for the group of pre-closure separators to those for ultimately displaced workers we can try to evince what kind of

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very sensitive to the exclusion (or inclusion) of the lags and/or leads dummies indicating displacement, and, using an F-test, the individual specific time trends resulted very insignificant. Therefore, I opted for the specification (1).

[16] If such correlation does exist at the moment of displacement, the most favorable case would be the stationarity of the errors around the year of displacement. See JLS for a throughout discussion about the properties of the error term and the resulting biases.

selection process is dominating. If the estimated wage losses for pre-closure separators are lower than those for ultimately displaced workers it probably means that pre-closure separations are principally the result of a selection process characterized by pre-emptive quits (defined *auto-selection hypothesis*). If instead the estimated earnings losses for pre-closure separators are greater than those for ultimately displaced workers it probably means that pre-closure separators are principally the result of a selection process characterized by "low-quality" workers layoffs (the selected lay-offs hypothesis)[17]. In the last sentences I have used the word "probably" because a third possibility is that even the selected pre-closure separations[18] could be not connected to the impending closure. If this third possibility holds, we could simply regard the estimated earnings losses for the group of ultimately displaced workers as the cost of displacement due to plant closure. If it doesn't hold, finding lower/greater earnings losses for pre-closure separators would mean that the estimated earnings losses for the group of ultimately displaced workers overestimate/underestimate the cost of displacement due to plant closure. Therefore, a way for a cautious solution to this problem could be to form a group of workers that separate from the closing firm in the year of firm-closure or in the previous year, i.e. the union of pre-closure separators and ultimately displaced workers (defined *2 years window closure displaced workers, 2 y.w.c.d.w.*). Then, if the estimated losses of pre-closure separators are lower/higher than those of ultimately displaced workers, I will regard the estimates concerning ultimately displaced workers as upper/lower bound estimates of the effect of displacement due to plant closure and the estimates for *2 y.w.c.d.w.* group as lower/upper bound estimates.

The next step will be to look at these figures from the perspective of the pre-displacement characteristics of workers (and their firms) and the post displacement mobility outcomes. The simpler strategy is to interact the displacement dummies of regressions (1) with variables representing the worker/firm characteristics we are interested in. The pre-displacement characteristics and the post-displacement mobility outcomes we consider are the following:

[17] According to the descriptive statistics, I would naturally propend for the first hypothesis.
[18] Remember from paragraph II that I have included a worker that leaved its firm during the year preceding its closure in the pre-closing separators group if and only if during this year there was a net reduction in the number of employees.

- Blue Vs White collars: the type of occupation at the left job (that, presumably, is correlated with the skill dimension);
- Males Vs Females;
- Age: I will divide the sample of displaced workers in three categories (less than 30 years old, between 30 and 40 years old, more than 40 years old) according to the age at the moment of displacement;
- Manufacturing Vs Services workers: according to the sector of the firm of displacement;
- Firm size: displaced workers that are displaced from a firm that, at the end of the year preceding displacement[19], has more or less than 18 employees;
- Local labor market conditions: I will differentiate between local labor markets (corresponding to Italian regions) that, during the year of displacement, have an unemployment rate greater or lower than the Italian average;
- Change sector: I will differentiate between workers that change their sector of employment or that don't (reference jobs are the sector of the job of displacement and the sector of the first post displacement job);
- Change type of job: I will differentiate between workers that change their type of job and workers that don't (reference jobs are the job of displacement and the first post displacement job).

However, to reduce parameters, I will use a different strategy to build the dummy variables indicating displacement. I will use only three dummies: one for the pre-displacement years (Pre), one for the year of displacement and the subsequent three years (short run, SR) and one for the last (fourth, fifth, sixth and seventh) post-displacement years (long-medium run, LMR). Therefore the estimated equations will take the following form:

$$(2)\; Y_{it} = X_{it}\beta + \sum_{K=1}^{3} D(K)_{it}\delta_K + \sum_j \sum_{K=1}^{3} D(K)_{it} \cdot G_{it}^j \cdot \psi_{K,j} + \alpha_i + \gamma_t + u_{it} ,$$

The characteristics we analyze can be described as categorical variables (for example classes of firm size, males Vs females,...), so G is simply an indicator function for whether individual i is a member of group j.

[19] I consider firm size the year preceding displacement because firm closures necessarily result in zero employees at the end of the year of displacement/closure.

IV. Results

Figure 3 plots the percentage annual real aggregate earnings losses deriving from the estimated coefficients of model (1) against the number of years before or after workers' separations[20]. Remember from the previous sections that we have defined the losses as the difference between the actual labor market outcomes of displaced workers and their outcomes had they not experienced a displacement[21]. The second term of this difference represent the counterfactual situation of displacement that cannot be observed and that is substituted by the control group outcomes.

As found in many other studies about U.S., also Italian data show that ultimately displaced workers and mass-layoffs separators experience earnings losses even before displacement and that the divergence of the actual earnings of these displaced workers from their expected levels accelerates as displacement get closer. Thus, even if the magnitude of these losses is modest (especially if compared to American studies), it seems that the events that lead to workers' displacements negatively influence workers' earnings. However, as advocated by our informal specification test described in the previous paragraph, the estimated losses are generally small (and often not statistically different from 0) for time periods more than two years before separation. The highest losses are registered during the year of displacement and the subsequent year (around -20%) and they are followed by a recovering of earnings. This process of recovering stops approximately the third year after displacement and subsequently, during the fifth post-displacement year, it seems to get its strength back. However, seven years after displacement aggregate earnings of displaced workers still depart by about 10% from those of the control group[22].

We have just defined some common features of the estimated aggregate earnings losses that hold for all the groups of workers analyzed but only-mass-layoffs, pre-closing separators and other movers. If we look at the results for the latter group we can clearly see, even from the simple observation of the graph, that the pre-separation earnings of these workers don't meaningfully differ much from those of workers that never left their 1985-firm. However, I don't want to

[20] Tables A.1, A.2 and A.3 in the appendix reports coefficients, standard errors and p-values.
[21] When I consider the other movers group, the counterfactual situation is no mobility.
[22] The coefficients associated with the dummies indicating the seventh year after displacement are not always statistically significant (see Appendix); however they result highly significant in the estimates based on a larger version of the sample (1: 90 instead of 1: 180), whose results are forthcoming.

overemphasize the estimation results for the other movers groups, cause mobility cannot be considered as an exogenous variable in an earnings-regression. Therefore, I will look at the estimation results for the other movers not to give them a causal interpretation, but simply to compare them with the results for other groups. Table A.1 shows that only in the year of mobility (0) and in the previous (-1) and subsequent (+1) year the coefficients of the dummies δ^K are negative and statistically significant, indicating aggregate earnings losses of, at maximum, 4%. Theses losses could be simply the result of the loss of some days of work during the transition from the old to the new job and/or they could be the result of the inclusion of some workers that have been laid-off on an individual basis. During the following years, other movers' earnings tend to be equivalent to those of never displaced workers. The fact that the econometric model doesn't detect relevant earnings losses for workers that are not displaced constitutes additional supporting evidence for our results concerning displaced workers[23].

Let's now compare the results concerning the different groups of displaced workers. In the pre-displacement period ultimately displaced workers fare better than mass-layoffs and only mass-layoffs: the highest losses among these three groups are registered by the only-mass-layoffs group. Moreover, pre-separation coefficients for the only-mass-layoffs and mass-layoffs groups are already negative and statistically significant at, respectively, the fifth and the fourth pre-displacement years, whereas for ultimately displaced workers the corresponding critical point is set at the second pre-displacement year. Two years before displacement the aggregate earnings of the ultimately displaced, mass-layoffs and only mass-layoffs groups respectively depart by about 4%, 5% and 10% from those of the control group. During the subsequent year, i.e. the pre-displacement year, the only-mass-layoffs group looses (with respect the control group) about 15%, while the corresponding figures for the mass-layoffs and the ultimately displaced groups are respectively 8% and 6%. This evidence could be connected to the fact that during mass-layoffs that are not followed by the closure of the firm, employers can select "less useful/productive" workers to be laid-off, whereas, by definition, a firm closure determines the separation of all the workers, irrespective of their past histories (i.e., the selected layoffs hypothesis for only-mass-layoffs).

[23] On this point J.Angrist and A.Krueger (1998) (page 56) wrote: "…non experimental research designs can be assessed by comparing pre-treatment trends for the treatment and comparison group (e.g., Ashenfelter and Card, 1985, and Heckman and Hotz, 1989) or by looking at effects where there should be none (e.g., Bound, 1989)".

On the other hand, the estimates for pre-closing separators clearly contrast with those for the three groups on which we have just focused. Workers that separate the year preceding the closure of their firms experience no statistically and economically significant aggregate earnings losses until the year preceding their mobility. During the year of separation and the previous year I estimate earnings losses of about, respectively, 7% and 5% (thought coefficients are not statistically significant).

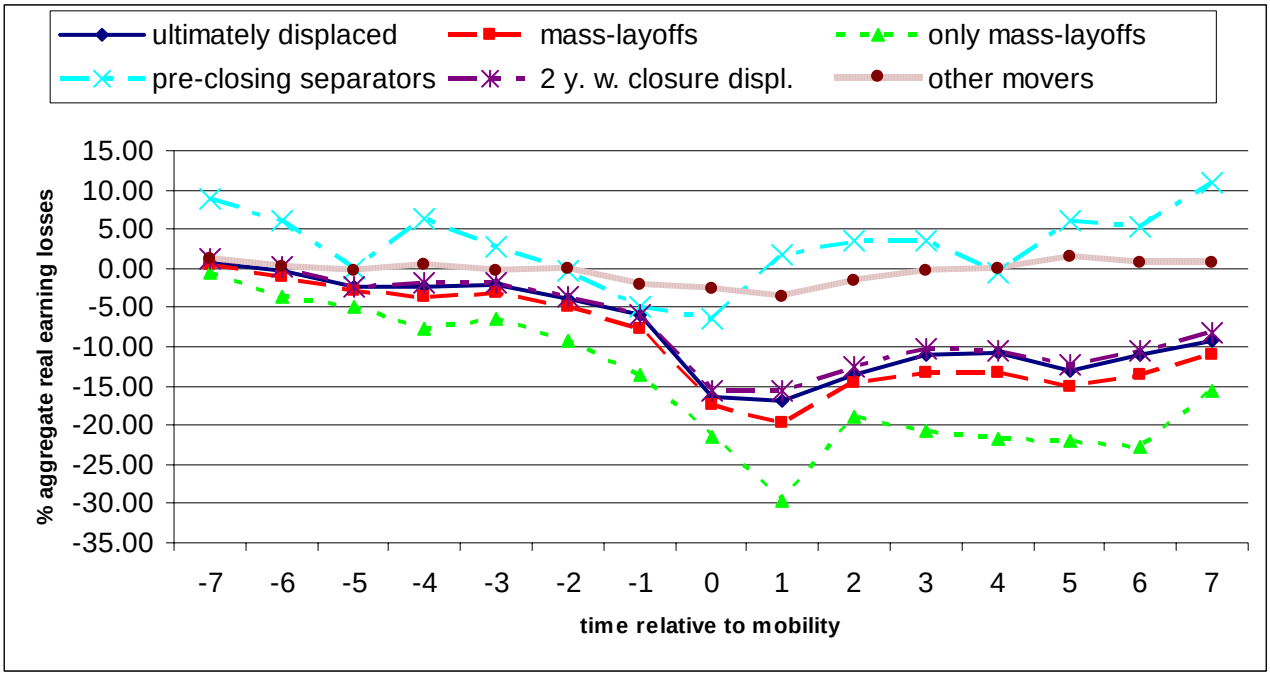

Figure 3. Estimated percentage aggregate earnings losses of displaced workers and other movers.

The fact that pre-closing separators (pre-mobility) earnings are not statistically different from those of the control group and that the estimated coefficients are positives till the year preceding separation seems to support the auto-selection hypothesis exposed in the previous paragraph. Moreover, during the separation and the previous year they loose less than the other displaced workers but more than the other movers group; during post separation years the estimated coefficients are not statistically different from zero and, besides, they have positive sign. Naturally, it could also be that pre-closing separations are simply not related to the impending closure of the firm. Therefore, I will cautionary interpret the estimates concerning ultimately displaced workers as

upper bound estimates of the effect of a plant closure on earnings and the estimates for *2 y.w.c.d.w.* group as lower bound estimates. However, with respect both the magnitude and the statistical significance of the differences, the results for the two groups are rather similar. This is probably due to the fact that in this random sample of high-tenure workers the phenomenon of pre-closure separation is numerically not very relevant[24].

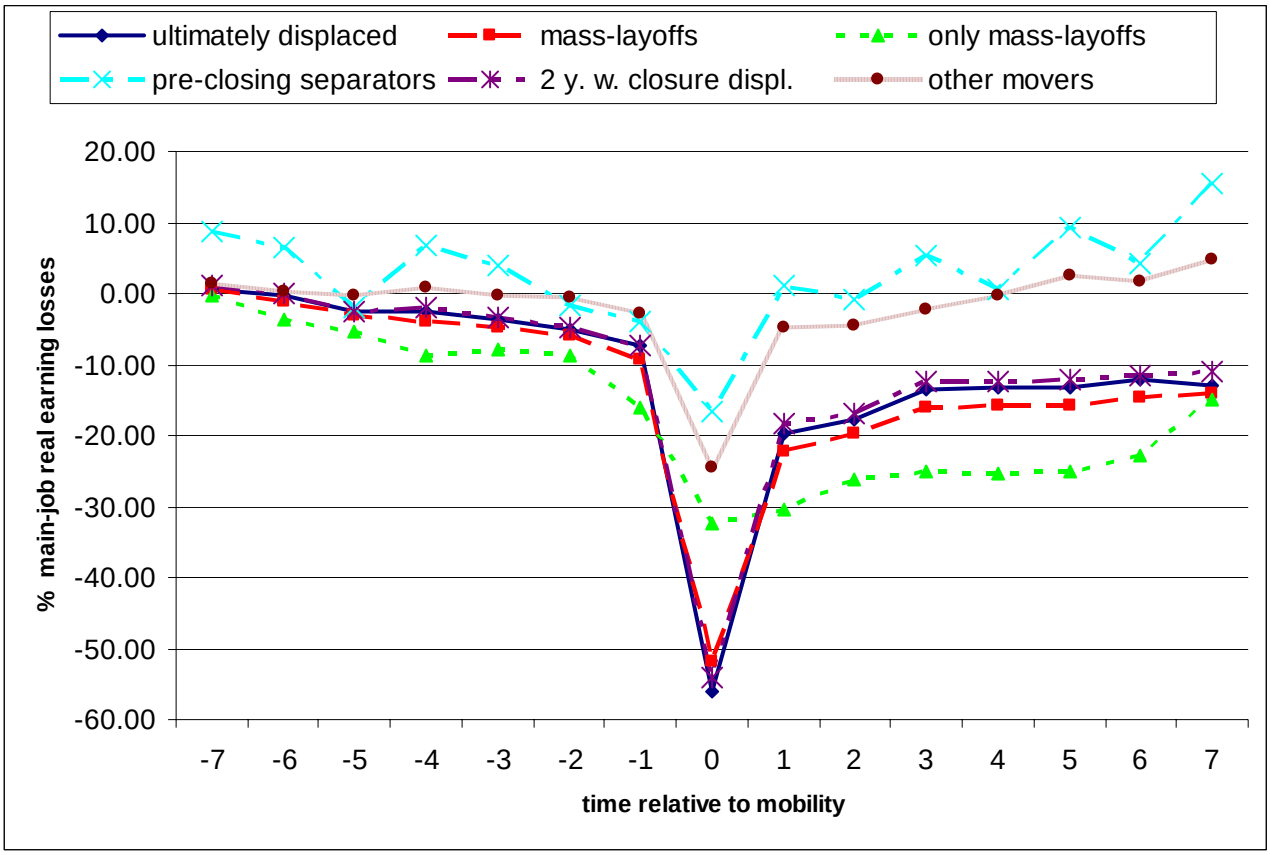

Figure 4. Estimated percentage main-job earnings losses of displaced workers and other movers.

Up till now I have not considered the results concerning the other dependent variable: main-job earnings (figure 4). In general, if we consider only the earnings deriving from the main job, the estimated earnings losses of displaced workers (ultimately displaced, mass-layoffs, only mass-layoffs and the *2 y.w.c.d.w.* group) tend to be bigger before and after displacement[25]. This could be

[24] Relaxing the restriction about employment flows concerning pre-closure separations doesn't change the main results.

[25] Comparing main job and aggregate earnings losses during the year of mobility it is not very informative. The difference between them could be simply related to the timing of separation within the relevant year.

due to the fact that displaced workers are relatively more inclined to have multiple jobs in order to integrate their main job earnings and/or because displaced workers are less attached to their new jobs. Estimated pre-separation losses in terms of aggregate earnings and main-job earnings are very similar from lag -7 to lag -4, but three years before displacement the latter begin to be higher than the former. During the post-displacement period the losses in term of main-job earnings continue to be higher than losses in term of aggregate earnings, though this difference tend progressively to reduce.

Figure 5 and figure 6 respectively reports the estimated percentage *aww and aaww* losses of displaced workers and other movers. Comparing the two figures, it is evident that the main difference is related to the estimated wage losses suffered during the year of displacement.

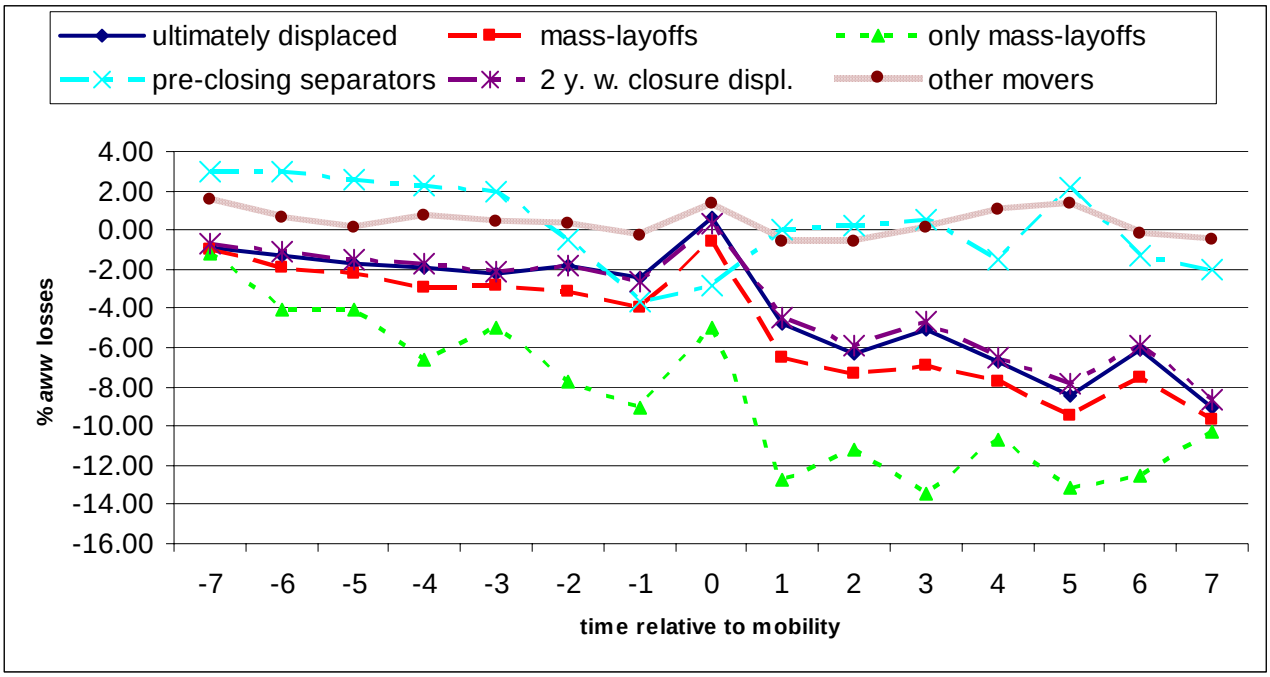

Figure 5. Estimated Percentage *aww* losses of displaced workers and other movers.

As explained in section II, we have defined two different weekly wage variables to take into account the fact that, during the year of mobility, the earnings at the left job could be inflated by some of its components that are higher during the last year of employment in a particular firm: repayments for accumulated vacations and back-payments due to law or contract. Moreover, given

their characteristics, it is likely that the share of this kind of compensations in earnings is proportional to the tenure of the worker. If these hypotheses hold, using aww as dependent variable would imply an overestimation of the wage at the left firm (whose magnitude would be directly proportional to the tenure of the worker) and therefore an attenuation of the estimated consequences of displacement in terms of wage losses.

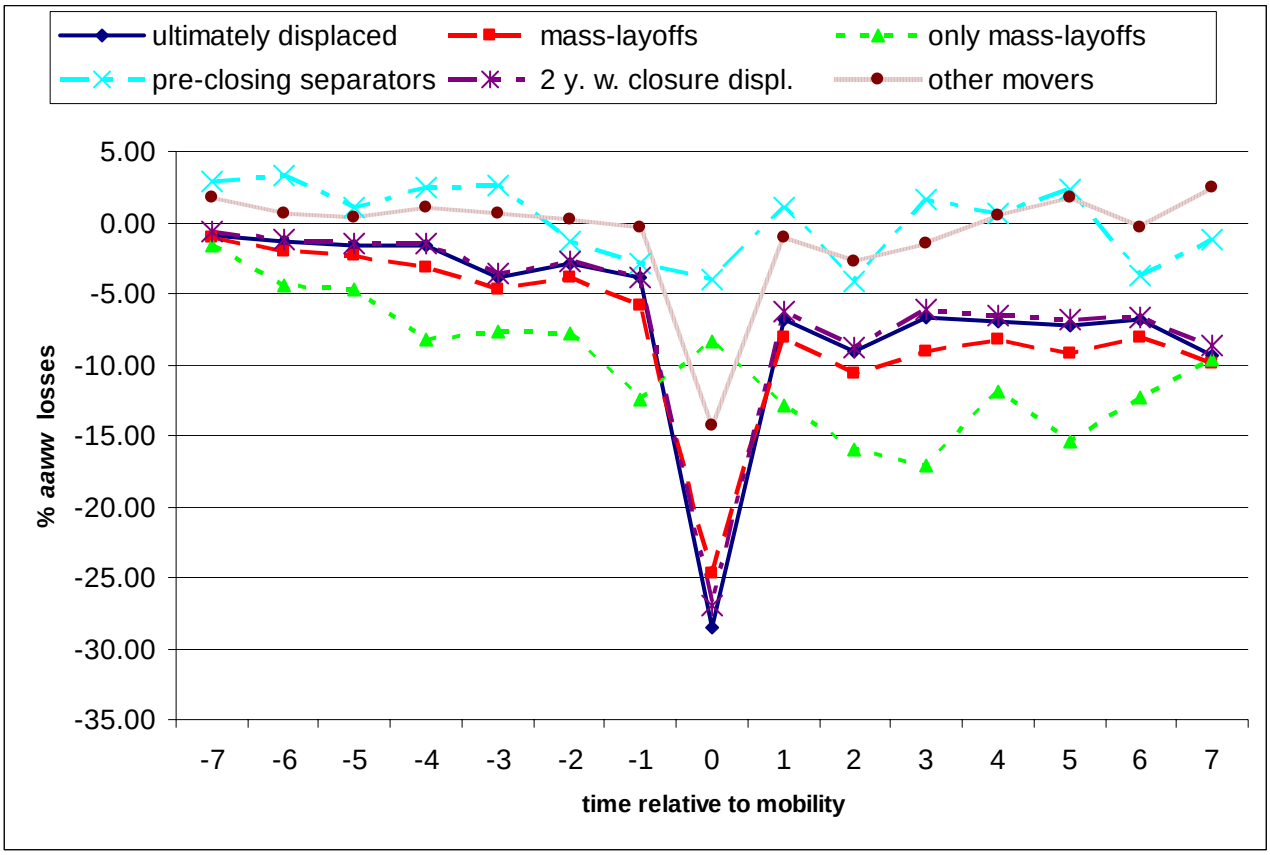

Figure 6. Estimated Percentage *aaww* losses of displaced workers and other movers.

In fact, during the year of mobility, using aaww as dependent variable I estimate greater wage losses than using aww. However, if using aww I risk to underestimate the wage losses during the year of mobility, probably using aaww I overestimate them, cause I don't consider the wage at the left firm that it is very likely, especially for displaced workers, to be higher than the wage at the new firm. Thus, the truth lies in the middle. Given that I have no other information to disentangle the percentage of the earnings due to the compensation components outlined above (during the year

of displacement at the left job), this is the only feasible strategy. However, fortunately, the estimated wage losses for the other periods are quantitatively very similar.

As for earnings, estimated wage losses of ultimately displaced workers, mass-layoffs and the *2 y.w.c.d.w.* are similar. I estimate wage losses even before displacement and the divergence of the actual wages of these displaced workers from their expected levels accelerates as displacement get closer. Another important general finding is that wages begin to decline before aggregate earnings: it seems that firms adjust to the negative economic events that lead to workers' displacements firstly by trying to save on workers' wages.

However, as advocated by our informal specification test described in the previous paragraph, the estimated wage losses of ultimately-displaced and *2 y.w.c.d.* workers group are generally small (and often not statistically different from 0) for time periods more than four years before separation. The mass-layoff sample is instead characterized by a more persistent pattern of pre-displacement wage losses: the estimated coefficients are negative and statistically significant for all the pre-separation years. Looking at the estimated wage losses of the only mass-layoffs group, this pre-displacement dynamics is even more evident. This finding reinforce the credibility of the selected layoffs hypothesis for the group of only-mass-layoffs. Post-displacement wages losses of displaced workers follow an irregular path that is characterized by the absence of signals pointing at a recovery of wages: seven year after displacement I still estimate wage losses of about 10%. However, also with respect post-displacement outcomes, the mass-layoff group (and the only mass-layoffs group) appear to be worse-off with respect ultimately displaced and *2 y.w.c.d.* workers. This evidence is another time consistent with the selected-layoffs hypothesis: during mass-layoffs not connected to firm closures employers lay off the "less useful/productive" workers (whose performance was poor in the years before separation) and, after displacement, estimated wage losses of these workers tend to be higher than those of workers displaced due to firm closure.

On the other hand, the estimates for pre-closing separators clearly contrast with those for the three groups on which we have just focused. Workers that separate the year preceding the closure of their firms never experience statistically significant wage losses. During the year preceding separations I estimate wage losses of about 3% (thought the coefficient is not statistically significant). The fact that pre-closing separators pre-mobility wages are not statistically different from those of the control group and that the estimated coefficients are positives till the year

preceding separation seems, another time, to support the auto-selection hypothesis. Moreover, during post separation years the estimated coefficients are not statistically different from zero and, with few exceptions, they have positive sign. As for earnings, I will cautionary interpret the estimates concerning ultimately displaced workers as upper bound estimates of the effect of a plant closure on wages and the estimates for *2 y.w.c.d.w.* group as lower bound estimates. However, also in this case, with respect both the magnitude and the statistical significance of the differences, the results for the two groups are rather similar.

Other movers wage-losses are modest and concentrated in the years immediately following mobility. As for earnings, the fact that the econometric model doesn't detect relevant wage losses for workers that are not displaced constitutes additional supporting evidence for our results concerning displaced workers.

Let's now concentrate on the consequences of displacement in terms of employment. Figures 7 and 8 describe the estimated losses with respect worked weeks considering as dependent variable, respectively, aggregate worked weeks and main-job worked weeks.

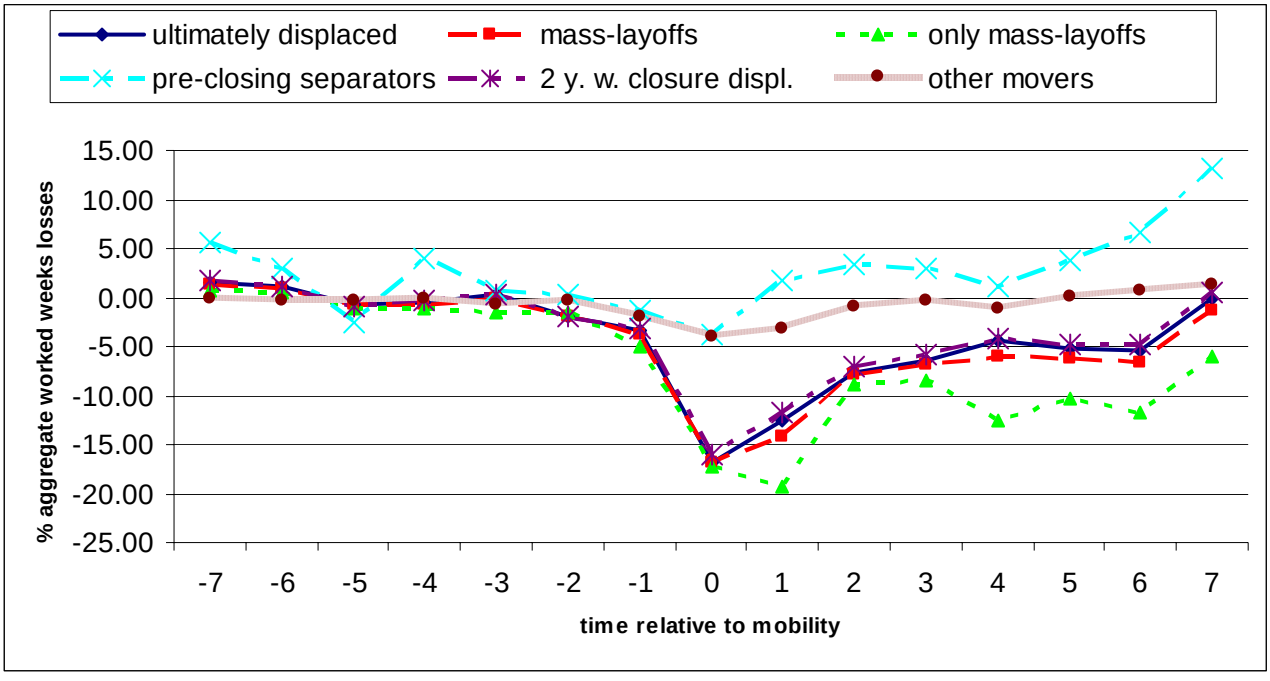

Figure 7. Estimated percentage aggregate worked weeks losses of displaced workers and other movers.

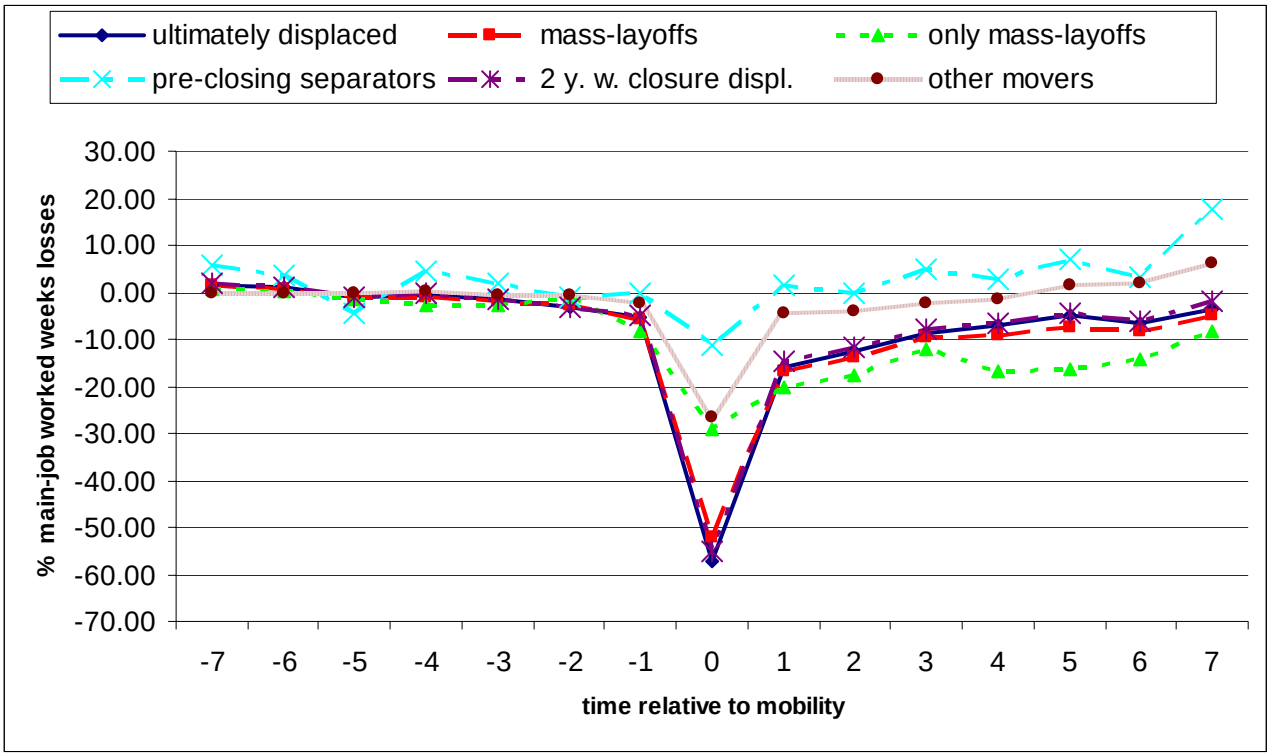

Figure 8. Estimated percentage main-job worked weeks losses of displaced workers and other movers.

As for earnings and wages, the estimated losses of ultimately displaced workers, mass-layoffs and *2 y.w.c.d.* workers are very similar. An economically and statistically meaningful divergence of the actual worked weeks of these displaced workers from their expected levels begins, considering main-job worked weeks, two years before displacement and, considering aggregate worked weeks, only the year before displacement. Aggregate worked weeks reduction due to displacement reaches its peak around the year of displacement, with losses of more than 15%. During the post-displacement periods the losses tend progressively to reduce: seven years after displacement estimated losses are highly insignificant, both statistically and economically. Therefore, it appears that long term earnings losses in this sample of high tenure displaced workers are mainly due to persistent wage reductions and not to losses in terms of worked weeks[26]. This finding is in line with the results of the international empirical literature on the consequences of displacement (Ruhm, 1991; Fallick, 1996).

[26] The sample selection strategy of excluding workers that don't have earnings in private dependent sector in a given year could be probably the key determinant of this result. See appendix A.5.

Also with respect to employment, the estimates for pre-closing separators clearly diverge from those for the three groups we have just described. Workers that separate the year preceding the closure of their firms never experience statistically significant losses in terms of worked weeks. Only during the year of mobility I estimate economically relevant worked weeks losses, of only about 4%. Moreover, it appears that in the post separation period, especially in terms of the main-job dependent variable, pre-closing separators work more than the control group. Another time, for this group the auto-selection hypothesis seems more credible than the selected layoffs hypothesis.

The estimated losses for the only-mass-layoffs group are very similar to those for ultimately displaced workers, especially during the pre-displacement period and the year of displacement. Therefore, these two groups differ more in term of wages than in terms of worked weeks. Figure 7 and 8 also show that during the year following displacement the only-mass-layoffs' losses in term of aggregate worked weeks are considerably higher than those for ultimately displaced workers. The estimated losses in term of aggregate worked weeks reach a peak during the first post-displacement year, not during the year of mobility (as it happens for all the other groups). Instead, we don't detect such phenomenon if we look at main-job worked weeks: it seems that the comparatively worse short run employment consequences of displacement for only mass-layoffs workers are especially due to the fact that they are less likely to hold multiple jobs and, therefore, to integrate their main-job earnings. Indeed, looking back at figures 3 and 4, we can notice that, if earnings losses in terms of the main-job dependent variable reach a peak during the year of displacement, aggregate earnings losses reach a peak during the post-displacement year.

Other movers employment-losses are modest and concentrated in the years around mobility. As for earnings and wages, the fact that the econometric model doesn't detect relevant losses for workers that are not displaced constitutes additional supporting evidence for our results concerning displaced workers.

Let's now look at the effects of displacement from the point of view of the characteristics of the displaced workers and their post displacement mobility outcomes. Tables 2.1 and 2.2 reports the estimated coefficients of model (2) for ultimately displaced workers. I decompose earnings, wage

and employment reductions following or preceding displacement with respect the characteristics of workers at the left job[27] and their post-displacement mobility outcomes.

The baseline worker we consider is a less than 30 years old woman, who works in a firm with more than 18 employees in the manufacturing sector as a white-collar. She works in a local labor market whose unemployment rate (during the year of displacement) is lower than the Italian average and, after displacement, she doesn't change sector or type of occupation. This kind of worker doesn't experience losses due to displacement: she is in a better situation, both before and after displacement, with respect the other non-displaced workers. She has higher aggregate earnings and wages; however, she has a comparatively higher tendency to change job and/or to hold multiple jobs in a give year.

The most important determinant of workers' losses is age. Workers that at the time of displacement were between 30 and 40 years old have very high pre and post displacement earnings losses (with respect younger workers), both with respect aggregate and main-job earnings. However, such earnings losses appear, especially in the long run, to be the consequence of wage reductions more than of reductions in worked weeks. Also more than 40 years old workers are particularly hit by displacement, even if comparatively less than workers who were between 30 and 40 years old at the moment of displacement. Therefore it seems that the effect of age on the consequences of displacement is decreasing. Moreover the losses of older workers appear to be determined even more by wage reductions than by worked weeks reductions. The importance of age as a determinant of wage reductions due to displacement is a finding that is robust and uniform across countries[28]. Therefore the age structure of a national labor market has important consequences on its capabilities to adapt to change.

Blue collar workers are hit comparatively more than white collars by displacement. In this case, however, the impact of the type of occupation on the consequences of displacement seems to act

[27] Results for the 2 y.w.c. displaced workers are equivalent and are not reported. Given the observations of above (i.e. the possible endogeneity of the mass layoffs dummies, that is related to the selected layoffs hypothesis), I don't estimate model (2) for mass-layoffs and only mass layoffs.

[28] See Kuhn et al. (2002)

more through a reduced employability than through wage cuts. Another time, the international literature on displaced workers conforms with the described Italian patterns[29].

	Aggregate real earnings			Main job real earnings			aww			aaww		
	Pre	SR	LMR	Pre	SR	LMR	Pre	SR	LMR	Pre	SR	LMR
All workers	**.186****	**.279*****	**.249****	**.202****	**-.559*****	**.137***	**.078*****	**.144*****	**.137***	**.098*****	**-0.103**	**-0.094**
SE	0.078	0.096	0.118	0.08	0.151	0.076	0.023	0.045	0.076	0.028	0.135	0.177
P-value	0.018	0.004	0.034	0.012	0.000	0.072	0.001	0.001	0.072	0.000	0.444	0.595
CIG	**-0.086**	**-.191***	**-.226***	**-.094***	**-0.128**	**-.099***	**-0.048**	**-.121*****	**-.099***	**-.052***	**0.011**	**0.05**
SE	0.056	0.108	0.121	0.057	0.155	0.056	0.031	0.042	0.056	0.031	0.105	0.159
P-value	0.124	0.077	0.061	0.098	0.409	0.077	0.12	0.004	0.077	0.097	0.914	0.755
Age =>30 & <40	**-.211*****	**-.316*****	**-.268****	**-.210*****	**-.294****	**-.163****	**-.080*****	**-.138*****	**-.163****	**-.081*****	**-.261****	**-.369****
SE	0.072	0.086	0.106	0.072	0.125	0.067	0.02	0.037	0.067	0.02	0.109	0.144
P-value	0.003	0.000	0.012	0.004	0.018	0.015	0.000	0.000	0.015	0.000	0.017	0.011
Age >= 40	**-.180****	**-.234*****	**-.211****	**-.183****	**-0.186**	**-.142****	**-.070*****	**-.094****	**-.142****	**-.075*****	**-.229****	**-.338****
SE	0.072	0.087	0.104	0.072	0.126	0.066	0.018	0.038	0.066	0.02	0.109	0.143
P-value	0.012	0.007	0.043	0.011	0.141	0.031	0.000	0.013	0.031	0.000	0.035	0.018
Small firm	**0.008**	**-0.008**	**-0.015**	**-0.003**	**-0.037**	**-0.027**	**-0.004**	**0.009**	**-0.027**	**-0.012**	**-0.034**	**-0.041**
SE	0.022	0.048	0.054	0.023	0.076	0.036	0.01	0.026	0.036	0.011	0.072	0.085
P-value	0.731	0.859	0.786	0.897	0.63	0.455	0.66	0.723	0.455	0.273	0.638	0.629
Services	**0.008**	**0.051**	**0.037**	**-0.007**	**0.131**	**0.001**	**0.002**	**-0.018**	**0.001**	**-0.012**	**0.012**	**0.032**
SE	0.021	0.045	0.055	0.025	0.085	0.039	0.01	0.03	0.039	0.017	0.083	0.088
P-value	0.693	0.262	0.5	0.781	0.124	0.971	0.886	0.554	0.971	0.471	0.881	0.715
Blue collars	**-.052****	**-.165*****	**-.170*****	**-.060****	**-0.115**	**-0.062**	**-0.018**	**-.070****	**-0.062**	**-.031****	**-0.108**	**-0.119**
SE	0.023	0.044	0.05	0.025	0.082	0.039	0.011	0.033	0.039	0.015	0.081	0.085
P-value	0.021	0	0.001	0.016	0.161	0.117	0.104	0.034	0.117	0.047	0.184	0.161
Men	**0.026**	**0.039**	**0.046**	**0.024**	**0.054**	**.095****	**0.009**	**0.051**	**.095****	**0.007**	**0.032**	**0.119**
SE	0.025	0.047	0.057	0.026	0.075	0.044	0.012	0.034	0.044	0.013	0.075	0.086
P-value	0.301	0.402	0.415	0.357	0.471	0.032	0.454	0.13	0.032	0.593	0.669	0.167
Local Unempl. rate	**0.008**	**-.132***	**-.137***	**0.021**	**-0.057**	**0.000**	**-0.001**	**0.037**	**0.000**	**0.005**	**0.01**	**0.033**
SE	0.02	0.068	0.072	0.022	0.091	0.048	0.013	0.041	0.048	0.016	0.088	0.100
P-value	0.708	0.051	0.056	0.344	0.527	0.997	0.955	0.369	0.997	0.751	0.912	0.745
Change occupation	**0.031**	**0.011**	**0.199**	**0.035**	**0.069**	**0.124**	**-.027***	**0.011**	**0.124**	**-0.023**	**-0.117**	**-0.035**
SE	0.054	0.127	0.173	0.054	0.168	0.11	0.016	0.051	0.11	0.017	0.147	0.182
P-value	0.569	0.929	0.251	0.523	0.682	0.261	0.092	0.82	0.261	0.167	0.427	0.849
Change sector	**-.045***	**-.281*****	**-.259*****	**-0.042**	**.168****	**0.010**	**-.019***	**0.001**	**0.01**	**-0.017**	**.386*****	**.481*****
SE	0.024	0.068	0.083	0.026	0.085	0.048	0.011	0.025	0.048	0.013	0.061	0.085
P-value	0.059	0.000	0.002	0.108	0.049	0.829	0.088	0.964	0.829	0.201	0.000	0.000

Table 2.1 Notes: Standard errors are robust to residuals that are not identically distributed and to observations that are independent across groups (individuals) but not necessarily independent within groups.

[29] See Kuhn et al. (2002)

	Aggregate worked weeks			Main job worked weeks		
	Pre	SR	LMR	Pre	SR	LMR
All workers	**0.107**	**0.133**	**0.109**	**.130***	**-.675*****	**-.619*****
SE	0.073	0.095	0.112	0.076	0.165	0.214
P-value	0.139	0.164	0.328	0.087	0.000	0.004
CIG	**-0.038**	**-0.069**	**-0.126**	**-0.048**	**0.003**	**-0.075**
SE	0.034	0.094	0.102	0.035	0.143	0.181
P-value	0.256	0.461	0.216	0.171	0.982	0.678
Age =>30 & <40	**-.131***	**-.176****	**-0.103**	**-.129***	**-0.188**	**-0.276**
SE	0.067	0.088	0.102	0.068	0.130	0.171
P-value	0.051	0.044	0.311	0.056	0.148	0.106
Age > 40	**-0.111**	**-0.139**	**-0.067**	**-.116***	**-0.156**	**-0.202**
SE	0.069	0.089	0.102	0.07	0.133	0.172
P-value	0.107	0.119	0.513	0.096	0.241	0.241
Small firm	**0.012**	**-0.018**	**0.012**	**-0.001**	**-0.069**	**-0.055**
SE	0.019	0.049	0.053	0.021	0.079	0.099
P-value	0.534	0.717	0.821	0.977	0.379	0.578
Services	**0.007**	**0.07**	**0.036**	**-0.014**	**0.123**	**0.113**
SE	0.017	0.048	0.054	0.025	0.094	0.104
P-value	0.694	0.145	0.508	0.562	0.191	0.277
Blue collars	**-.034***	**-.095****	**-.107****	**-.047****	**-0.035**	**-0.093**
SE	0.019	0.048	0.054	0.023	0.091	0.100
P-value	0.074	0.048	0.046	0.044	0.702	0.351
Men	**0.018**	**-0.012**	**-0.048**	**0.015**	**0.009**	**0.033**
SE	0.022	0.054	0.06	0.023	0.083	0.099
P-value	0.42	0.825	0.417	0.513	0.913	0.738
Local Unempl rate	**0.008**	**-.169****	**-.138***	**0.025**	**-0.052**	**0.049**
SE	0.015	0.077	0.08	0.019	0.099	0.112
P-value	0.58	0.028	0.086	0.198	0.599	0.663
Change occupation	**0.058**	**0.000**	**0.075**	**0.062**	**-0.048**	**-0.009**
SE	0.056	0.113	0.199	0.056	0.200	0.253
P-value	0.306	1.00	0.705	0.264	0.811	0.972
Change sector	**-0.026**	**-.282*****	**-.269*****	**-0.021**	**.231*****	**.342*****
SE	0.018	0.067	0.075	0.021	0.088	0.106
P-value	0.161	0.000	0.000	0.332	0.009	0.001

Table 2.2 Notes: Standard errors are robust to residuals that are not identically distributed and to observations that are independent across groups (individuals) but not necessarily independent within groups.

Another important determinants of the heterogeneity of the consequences of displacement are the macroeconomic conditions at the time of displacement. Workers that were displaced in local labor markets with an unemployment rate above the Italian average display higher post displacement earnings losses. Bad macro-conditions affect only the employability prospects of displaced

workers, not their future wages. The dummies indicating small firms and services employment and sex turned out, instead, to be insignificant.

Let's now look at the consequences of post displacement mobility on the heterogeneity of the effects of displacement. The losses of the workers that change type of occupation in the post displacement period are not different from the losses of the other comparable displaced workers[30]. However, displaced workers that change their sector of employment have higher losses than workers that don't change. This finding could be related, as many studies on displaced workers argue, to the loss of sectoral-specific (or firm-specific) human capital (or to the loss of union coverage). However, it appears that the higher earnings losses of Italian displaced workers that change sector should be imputed not to wage losses but to a lower post displacement employability. Moreover, comparing losses in term of aggregate worked weeks with those in term of main-job worked weeks, we can deduce that such losses are correlated to worse capabilities of holding multiple jobs and/or of changing job: the coefficients for the aggregate variable are negative (and highly significant), instead the coefficients for the main job variable are positive (and highly significant).

To take into account this Italian labor market institution, I have also introduced a dummy that signals if a particular worker was subject to the "Cassa Integrazione" (CIG or CIGS)[31] during the year of displacement at the left firm. The "Cassa Integrazione" is a subsidy that is granted to manufacturing workers employed in firms in bad economic situations, that guarantees a wage replacement rate of 80%. Results are somehow surprising. I find that these kind of workers experience higher losses both in the short run and in the long-medium run. Both kind of earnings losses seems to be related more to wage losses than to reduced employment prospects. Two possible explanations for this result are available: or "Cassa Integrazione" has a negative effect on displaced workers future wages or being subject to "Cassa Integrazione" is correlated to some factor I don't account for[32].

[30] A very low share of displaced workers (3%) change type of occupation.
[31] See appendix, section A.4.
[32] The estimated coefficients of the other variables indicating workers' characteristics don't appreciably change introducing or not the dummy indicating CIG.

V. Conclusions

The main conclusions of this empirical investigation on the consequences of displacement on high tenure Italian workers are the following.

- The descriptive statistics showed that, for high tenure Italian workers, job displacement is more common among women, unskilled workers and younger workers. Moreover, it appears that workers belonging to the control group, other movers and pre-closing separators differ from workers belonging to the other groups of displaced workers more in terms of wages than in terms of worked weeks.

- Other two important points emerged from the preliminary descriptive statistics. Firstly, the labor market characteristics (that we have observed in table 1, figure 1 and figure 2) of pre-closing separators are very different from those of ultimately displaced workers: the pre-closing separators group is relatively more skilled and have relatively greater percentages of men, of manufacturing workers and of older workers. Moreover, with respect to wage and earnings dynamics, pre-closing separators are relatively better-off. Secondly, workers displaced due to firm closure appear to be different from workers displaced during a mass-layoff not connected to a firm closure. The only-mass-layoffs group is comparatively less skilled and have greater percentages of men, of manufacturing workers and of older workers. Moreover, with respect to wage and earnings dynamics, only-mass-layoffs separators are relatively worse-off.

- Ultimately displaced workers and mass-layoffs separators experience earnings, wage and employment losses even before displacement and the divergence of the actual earnings of these displaced workers from their expected levels accelerates as displacement get closer. The highest earnings losses are registered during the year of displacement and the subsequent year (around -20%) and they are followed by a recovering of earnings. However, seven years after displacement aggregate earnings of displaced workers still depart by about 10% from those of the control group. Post-displacement wages losses of displaced workers follow an irregular path that is characterized by the absence of signals pointing at a recovery of wages: seven year after displacement I still estimate wage losses of about 10%. Aggregate worked weeks reduction due to displacement reaches its peak around the year of displacement, with losses of more than 15%. During the post-

displacement periods the losses tend progressively to reduce: seven years after displacement estimated losses are highly insignificant, both statistically and economically.

- On the other hand, the estimates for pre-closing separators clearly contrast with those for the two groups on which we have just focused. Workers that separate the year preceding the closure of their firms experience no statistically and/or economically significant earnings, wage and employment losses, with the exception of the year of mobility and of the preceding year. To take into account this fact (the so called "auto-selection hypothesis"), I have build another group of displaced workers that is formed by ultimately displaced workers and pre-closing separators (the *2 y.w.c.d.w.* group). However, probably due to low number of pre-closing separators that are present in this sample, estimates for ultimately displaced workers and this new composite group are practically equivalent.

- The estimates for the groups of mass-layoffs and only mass-layoffs showed a great persistency of pre-displacement wage losses that supported the so called "selected layoffs" hypothesis. Therefore the estimated losses of these two groups could overestimate the consequences of displacement. Such degree of persistency is not found for ultimately displaced workers and the *2 y.w.c.d.w.* group.

- The fact that the econometric model doesn't detect relevant losses for workers that are not displaced constitutes additional supporting evidence for our results concerning ultimately displaced workers and the *2 y.w.c.d.w.* group.

- The effects of displacement depend on the characteristics of displaced workers and their post displacement mobility outcomes. Older workers loose more; more in term of wages than of worked weeks. However, the effect of age on the consequences of displacement is decreasing. Blue collar workers are hit comparatively more than white collars by displacement. In this case, conversely, the impact of the type of occupation on the consequences of displacement seems to act more through a reduced employability than through wage cuts. Workers that were displaced in local labor markets with an unemployment rate above the Italian average display higher post displacement earnings losses. Bad macro-conditions affect only the employability prospects of displaced workers, not their future wages. The losses of the workers that change type of occupation in the post displacement period are not different from the losses of the other comparable displaced workers. However, displaced workers that change their sector of employment have higher

losses than workers that don't change. This finding could be related, as many studies on displaced workers argue, to the loss of sectoral-specific (or firm-specific) human capital. However, it appears that the higher earnings losses of Italian displaced workers that change sector should be imputed not to wage losses but to a lower post displacement employability. Moreover, comparing losses in term of aggregate worked weeks with those in term of main-job worked weeks, we can deduce that such losses are correlated to worse capabilities of holding multiple jobs and/or of changing job.

APPENDIX

A.1) General Sample Restrictions

I consider only workers that in 1991 have seven or more years of tenure with their current firm. Workers of the construction sector are excluded due to the high seasonality of their jobs. Therefore, I will keep out from the samples workers that experienced displacement or mobility before or during year 1991. These are the basic sample restrictions that apply to all the groups and that have already mentioned in the paper.

A.2) Firm Deaths

False firm death is a practical problem that arises in administrative-data-based studies of displacement. I have dealt with this kind of problem trying to individuate spurious information about firms' demography. Using the whole INPS (1:180) sample, I have individuated spurious firm deaths by controlling the post-displacement firms of, supposedly, displaced workers. In general, in order for a firm X to be the economic descendant of firm Y and/or firm Z, some share of workers leaving firm Y and/or firm Z must flow into firm X. Given that I have no information about all the workers employed in a given firm, I have adopted the following strategy: if two (statistically equivalent to 360 workers) or more workers happens to be employed in the same post-displacement firm I consider such closure(s) as a false firm death(s), i.e. merges and/or legal transformations.

Moreover, there are cases of mobility from firms that show zero employees at the end of the year but which, according to INPS data, didn't close during such year. Given that the firm employees variable is considered reliable (and much more reliable than the year of closure variable)

and that omissions/delays in dating the firm death are possible in the INPS panel, we have chosen to consider a worker displaced due to plant closure also if at the end of the year of mobility his past firm resulted without employees. To avoid considering as closed firms (at least temporarily) firms that routinely display zero employees at the end of the year (for example because of the characteristics of their activities or simply because of fiscal advantages), we have additionally controlled that these firms didn't display zero employees at the end of the previous (at least 7) years. As a consequence, I categorize as displacement due to firm-closure all the cases of worker mobility accompanied by a registered closure of the firm and all the cases of mobility associated with absence of workforce at the end of the reference year in the reference firm (always conditional on the absence of a false firm death as described above).

A.3) Estimates

Groups	Ultimately displaced		Mass-layoffs		Only mass-layoffs		Pre-closing separators		2 y. W. closing displ.		Other movers	
Annual earnings	aggregate	main job	aggregate	main job	aggregate	main job	aggregate	main job	aggregate	main job	aggregate	main job
-7	**0.007**	**0.007**	**0.004**	**0.005**	**-0.005**	**-0.003**	**0.084**	**0.083**	**0.011**	**0.011**	**.013****	**.014****
se	0.015	0.015	0.013	0.013	0.027	0.027	0.070	0.070	0.015	0.015	0.005	0.005
p	0.629	0.633	0.746	0.719	0.853	0.926	0.234	0.237	0.431	0.435	0.011	0.012
-6	**-0.002**	**-0.003**	**-0.010**	**-0.010**	**-0.036**	**-0.037**	**0.060**	**0.063**	**0.001**	**0.001**	**0.001**	**0.003**
se	0.016	0.017	0.014	0.015	0.030	0.030	0.074	0.073	0.016	0.016	0.006	0.006
p	0.890	0.864	0.491	0.480	0.231	0.229	0.421	0.388	0.950	0.967	0.810	0.596
-5	**-0.024**	**-0.026**	**-.030****	**-.032****	**-0.051**	**-0.054**	**0.000**	**-0.020**	**-0.024**	**-0.027**	**-0.002**	**-0.003**
se	0.018	0.018	0.015	0.016	0.031	0.035	0.090	0.093	0.017	0.018	0.006	0.007
p	0.170	0.155	0.050	0.048	0.103	0.127	0.998	0.827	0.177	0.141	0.814	0.697
-4	**-0.024**	**-0.025**	**-.037****	**-.039****	**-.080****	**-.091****	**0.061**	**0.065**	**-0.019**	**-0.019**	**0.005**	**0.008**
se	0.019	0.019	0.017	0.017	0.039	0.042	0.077	0.076	0.018	0.018	0.007	0.007
p	0.191	0.189	0.031	0.024	0.041	0.031	0.425	0.392	0.285	0.289	0.433	0.261
-3	**-0.020**	**-.038***	**-.031***	**-.048*****	**-.066****	**-.082****	**0.027**	**0.038**	**-0.018**	**-.034***	**-0.003**	**-0.002**
se	0.018	0.020	0.016	0.018	0.033	0.038	0.084	0.083	0.018	0.019	0.007	0.007
p	0.253	0.056	0.054	0.007	0.048	0.030	0.749	0.644	0.300	0.080	0.690	0.775
-2	**-.039****	**-.051****	**-.051*****	**-.060*****	**-.096*****	**-.090****	**-0.002**	**-0.017**	**-.037****	**-.050****	**-0.001**	**-0.006**
se	0.018	0.020	0.016	0.018	0.037	0.038	0.089	0.100	0.018	0.020	0.007	0.008
p	0.034	0.010	0.002	0.001	0.009	0.016	0.986	0.869	0.039	0.012	0.923	0.475
-1	**-.060*****	**-.076*****	**-.079*****	**-.098*****	**-.147*****	**-.176*****	**-0.050**	**-0.040**	**-.060*****	**-.075*****	**-.022*****	**-.028*****
se	0.019	0.020	0.018	0.019	0.044	0.049	0.101	0.100	0.019	0.020	0.008	0.009
p	0.001	0.000	0.000	0.000	0.001	0.000	0.618	0.692	0.001	0.000	0.005	0.001
0	**-.178*****	**-.822*****	**-.192*****	**-.730*****	**-.241*****	**-.391*****	**-0.067**	**-0.183**	**-.171*****	**-.777*****	**-.027*****	**-.282*****
se	0.028	0.038	0.024	0.032	0.045	0.047	0.096	0.129	0.027	0.037	0.009	0.015
p	0.000	0.000	0.000	0.000	0.000	0.000	0.483	0.154	0.000	0.000	0.002	0.000
1	**-.184*****	**-.219*****	**-.220*****	**-.250*****	**-.350*****	**-.362*****	**0.017**	**0.012**	**-.170*****	**-.203*****	**-.038*****	**-.050*****
se	0.027	0.029	0.025	0.027	0.061	0.061	0.086	0.090	0.026	0.028	0.010	0.011
p	0.000	0.000	0.000	0.000	0.000	0.000	0.840	0.891	0.000	0.000	0.000	0.000
2	**-.145*****	**-.197*****	**-.158*****	**-.219*****	**-.211*****	**-.304*****	**0.034**	**-0.008**	**-.133*****	**-.184*****	**-0.017**	**-.046*****
se	0.029	0.032	0.026	0.029	0.053	0.064	0.094	0.110	0.028	0.031	0.011	0.012
p	0.000	0.000	0.000	0.000	0.000	0.000	0.716	0.945	0.000	0.000	0.122	0.000
3	**-.117*****	**-.144*****	**-.142*****	**-.175*****	**-.232*****	**-.287*****	**0.034**	**0.052**	**-.108*****	**-.131*****	**-0.003**	**-.023***
se	0.029	0.034	0.026	0.031	0.052	0.070	0.095	0.095	0.028	0.032	0.012	0.013
p	0.000	0.000	0.000	0.000	0.000	0.000	0.719	0.588	0.000	0.000	0.819	0.083
4	**-.114*****	**-.141*****	**-.142*****	**-.173*****	**-.246*****	**-.291*****	**-0.005**	**0.006**	**-.110*****	**-.133*****	**-0.001**	**-0.003**
se	0.030	0.035	0.027	0.032	0.060	0.071	0.117	0.118	0.030	0.034	0.014	0.016
p	0.000	0.000	0.000	0.000	0.000	0.000	0.968	0.957	0.000	0.000	0.930	0.843
5	**-.141*****	**-.141*****	**-.164*****	**-.173*****	**-.249*****	**-.287*****	**0.058**	**0.090**	**-.131*****	**-.128*****	**0.014**	**0.025**
se	0.043	0.045	0.036	0.039	0.066	0.078	0.113	0.113	0.040	0.042	0.016	0.018
p	0.001	0.002	0.000	0.000	0.000	0.000	0.608	0.426	0.001	0.002	0.391	0.184
6	**-.118*****	**-.130*****	**-.147*****	**-.158*****	**-.258*****	**-.258*****	**0.052**	**0.041**	**-.110*****	**-.122*****	**0.006**	**0.017**
se	0.041	0.045	0.036	0.040	0.070	0.080	0.121	0.143	0.038	0.043	0.019	0.022
p	0.004	0.004	0.000	0.000	0.000	0.001	0.667	0.773	0.004	0.004	0.757	0.449
7	**-0.097**	**-.138***	**-.116***	**-.151****	**-.170****	**-.163***	**0.103**	**0.145**	**-0.086**	**-.117***	**0.008**	**0.046**
se	0.069	0.074	0.060	0.065	0.075	0.084	0.092	0.094	0.062	0.067	0.026	0.030
p	0.162	0.063	0.054	0.020	0.023	0.054	0.263	0.124	0.171	0.080	0.756	0.122
Prob.>F	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Observ.	130816	130816	133098	133098	124754	124754	123116	123116	131460	131460	125930	125930
Workers	9344	9344	9507	9507	8911	8911	8794	8794	9390	9390	8995	8995

Table A.1. Notes: Standard errors are robust to residuals that are not identically distributed and to observations that are independent across groups (individuals) but not necessarily independent within groups.

Groups	Ultimately displaced		Mass-layoffs		Only mass-layoffs		Pre-closing separators		2 y. W. closing displ.		Other movers	
Weekly Wages	aww	aaww	aww	aaww	aww	aaww	aww	aaww	aww	aaww	aww	aaww
-7	**-0.009**	**-0.009**	**-.010***	**-.011****	**-0.012**	**-.017***	**.029*****	**.029*****	**-0.007**	**-0.007**	**.015*****	**.017*****
se	0.006	0.006	0.005	0.005	0.008	0.009	0.011	0.011	0.006	0.006	0.003	0.003
p	0.138	0.136	0.058	0.034	0.172	0.058	0.006	0.006	0.239	0.232	0.000	0.000
-6	**-.013***	**-.014***	**-.019*****	**-.021*****	**-.041*****	**-.045*****	**.029****	**.032****	**-0.011**	**-0.012**	**.006***	**.007***
se	0.007	0.008	0.006	0.007	0.014	0.013	0.014	0.015	0.007	0.008	0.003	0.003
p	0.069	0.075	0.003	0.003	0.003	0.001	0.040	0.031	0.121	0.125	0.055	0.054
-5	**-.017***	**-0.016**	**-.022*****	**-.024*****	**-.041*****	**-.049*****	**0.025**	**0.011**	**-0.015**	**-0.015**	**0.001**	**0.003**
se	0.010	0.010	0.008	0.009	0.013	0.015	0.018	0.025	0.009	0.010	0.003	0.004
p	0.081	0.111	0.007	0.007	0.002	0.001	0.175	0.665	0.113	0.126	0.695	0.435
-4	**-.019****	**-.017***	**-.030*****	**-.032*****	**-.068*****	**-.086*****	**0.022**	**0.025**	**-.017***	**-0.015**	**.007***	**.010****
se	0.009	0.010	0.009	0.009	0.019	0.023	0.019	0.019	0.009	0.009	0.004	0.004
p	0.044	0.086	0.001	0.001	0.000	0.000	0.246	0.193	0.063	0.120	0.094	0.029
-3	**-.023****	**-.040*****	**-.029*****	**-.049*****	**-.051*****	**-.080*****	**0.019**	**0.026**	**-.021****	**-.036*****	**0.004**	**0.006**
se	0.010	0.012	0.009	0.011	0.019	0.026	0.024	0.023	0.009	0.012	0.004	0.004
p	0.014	0.001	0.001	0.000	0.008	0.002	0.424	0.262	0.022	0.002	0.324	0.180
-2	**-0.018**	**-.029****	**-.032*****	**-.040*****	**-.080*****	**-.082*****	**-0.005**	**-0.014**	**-0.018**	**-.028****	**0.003**	**0.002**
se	0.012	0.013	0.010	0.011	0.018	0.018	0.028	0.031	0.011	0.012	0.004	0.005
p	0.117	0.028	0.002	0.000	0.000	0.000	0.861	0.664	0.108	0.023	0.469	0.646
-1	**-.025***	**-.039****	**-.040*****	**-.060*****	**-.095*****	**-.133*****	**-0.037**	**-0.030**	**-.027****	**-.039*****	**-0.003**	**-0.004**
se	0.014	0.016	0.012	0.014	0.020	0.027	0.045	0.045	0.013	0.015	0.005	0.006
p	0.062	0.012	0.001	0.000	0.000	0.000	0.413	0.506	0.041	0.009	0.615	0.455
0	**0.006**	**-.335*****	**-0.006**	**-.283*****	**-.051****	**-.088*****	**-0.029**	**-0.041**	**0.003**	**-.315*****	**.013****	**-.154*****
se	0.015	0.033	0.012	0.027	0.023	0.026	0.030	0.044	0.014	0.031	0.005	0.011
p	0.682	0.000	0.609	0.000	0.025	0.001	0.335	0.346	0.829	0.000	0.011	0.000
1	**-.049*****	**-.070*****	**-.067*****	**-.084*****	**-.136*****	**-.138*****	**0.000**	**0.011**	**-.046*****	**-.064*****	**-0.006**	**-.011***
se	0.014	0.018	0.012	0.015	0.024	0.025	0.028	0.028	0.013	0.017	0.006	0.007
p	0.001	0.000	0.000	0.000	0.000	0.000	0.989	0.710	0.001	0.000	0.308	0.094
2	**-.065*****	**-.095*****	**-.076*****	**-.112*****	**-.119*****	**-.174*****	**0.002**	**-0.042**	**-.061*****	**-.092*****	**-0.006**	**-.028*****
se	0.020	0.023	0.017	0.020	0.025	0.035	0.030	0.060	0.019	0.022	0.006	0.008
p	0.001	0.000	0.000	0.000	0.000	0.000	0.956	0.486	0.001	0.000	0.342	0.001
3	**-.052*****	**-.069*****	**-.072*****	**-.096*****	**-.144*****	**-.187*****	**0.005**	**0.016**	**-.048*****	**-.063*****	**0.001**	**-.015***
se	0.020	0.023	0.017	0.020	0.028	0.034	0.032	0.032	0.018	0.021	0.007	0.009
p	0.009	0.003	0.000	0.000	0.000	0.000	0.881	0.618	0.009	0.003	0.924	0.092
4	**-.070*****	**-.073*****	**-.080*****	**-.086*****	**-.113*****	**-.126*****	**-0.015**	**0.006**	**-.067*****	**-.068*****	**0.010**	**0.005**
se	0.022	0.025	0.019	0.022	0.035	0.045	0.041	0.042	0.020	0.023	0.008	0.011
p	0.001	0.003	0.000	0.000	0.001	0.005	0.705	0.892	0.001	0.003	0.215	0.649
5	**-.088*****	**-.076****	**-.100*****	**-.097*****	**-.141*****	**-.167*****	**0.021**	**0.023**	**-.082*****	**-.070****	**0.013**	**0.017**
se	0.030	0.032	0.025	0.027	0.033	0.044	0.054	0.054	0.029	0.030	0.009	0.012
p	0.004	0.017	0.000	0.000	0.000	0.000	0.693	0.666	0.004	0.021	0.184	0.143
6	**-.063****	**-.070****	**-.078*****	**-.085*****	**-.134*****	**-.132*****	**-0.013**	**-0.038**	**-.061****	**-.069****	**-0.002**	**-0.003**
se	0.029	0.033	0.024	0.027	0.030	0.040	0.050	0.056	0.027	0.030	0.012	0.016
p	0.031	0.032	0.001	0.002	0.000	0.001	0.795	0.502	0.023	0.023	0.885	0.824
7	**-0.095**	**-0.098**	**-.102****	**-.105***	**-.108*****	**-.102****	**-0.020**	**-0.012**	**-.090***	**-0.091**	**-0.005**	**0.024**
se	0.061	0.066	0.052	0.057	0.034	0.044	0.055	0.053	0.054	0.059	0.015	0.020
p	0.116	0.142	0.049	0.066	0.001	0.019	0.711	0.825	0.093	0.124	0.756	0.219
Prob.>F	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Observ.	130816	130816	133098	133098	124754	124754	123116	123116	131460	131460	125930	125930
Workers	9344	9344	9507	9507	8911	8911	8794	8794	9390	9390	8995	8995

Table A.2 Notes: Standard errors are robust to residuals that are not identically distributed and to observations that are independent across groups (individuals) but not necessarily independent within groups.

Groups	Ultimately displaced		Mass-layoffs		Only mass-layoffs		Pre-closing separators		2 y. W. closing displ.		Other movers	
Worked weeks	aggregate	main job	aggregate	main job	aggregate	main job	aggregate	main job	aggregate	main job	aggregate	main job
-7	**0.016**	**0.016**	**0.014**	**0.014**	**0.007**	**0.008**	**0.054**	**0.054**	**0.018**	**0.019**	**-0.002**	**0.000**
se	0.014	0.014	0.012	0.012	0.028	0.028	0.071	0.071	0.014	0.014	0.005	0.005
p	0.243	0.236	0.266	0.249	0.812	0.772	0.443	0.449	0.181	0.176	0.708	0.930
-6	**0.011**	**0.010**	**0.009**	**0.008**	**0.005**	**0.004**	**0.030**	**0.035**	**0.012**	**0.011**	**-0.004**	**-0.002**
se	0.014	0.015	0.013	0.013	0.026	0.026	0.074	0.073	0.014	0.015	0.005	0.006
p	0.446	0.505	0.460	0.521	0.851	0.890	0.682	0.635	0.409	0.450	0.428	0.715
-5	**-0.007**	**-0.009**	**-0.008**	**-0.010**	**-0.011**	**-0.015**	**-0.025**	**-0.045**	**-0.009**	**-0.012**	**-0.003**	**-0.004**
se	0.017	0.018	0.014	0.015	0.027	0.032	0.092	0.095	0.017	0.017	0.006	0.006
p	0.676	0.626	0.577	0.509	0.699	0.641	0.789	0.637	0.595	0.503	0.610	0.502
-4	**-0.005**	**-0.005**	**-0.007**	**-0.010**	**-0.012**	**-0.026**	**0.039**	**0.044**	**-0.003**	**-0.002**	**-0.002**	**0.001**
se	0.016	0.017	0.014	0.015	0.031	0.035	0.072	0.072	0.016	0.016	0.006	0.006
p	0.751	0.775	0.626	0.518	0.685	0.450	0.586	0.539	0.873	0.913	0.740	0.925
-3	**0.003**	**-0.017**	**-0.001**	**-0.020**	**-0.015**	**-0.029**	**0.008**	**0.020**	**0.003**	**-0.015**	**-0.007**	**-0.006**
se	0.015	0.019	0.014	0.016	0.030	0.034	0.077	0.076	0.015	0.018	0.006	0.007
p	0.852	0.353	0.922	0.214	0.622	0.388	0.917	0.789	0.863	0.394	0.251	0.376
-2	**-0.020**	**-.034***	**-0.020**	**-.029***	**-0.015**	**-0.012**	**0.003**	**-0.009**	**-0.019**	**-.032***	**-0.004**	**-0.008**
se	0.017	0.019	0.015	0.017	0.031	0.031	0.082	0.093	0.016	0.019	0.006	0.007
p	0.226	0.079	0.187	0.075	0.617	0.703	0.967	0.924	0.247	0.086	0.521	0.248
-1	**-.034***	**-.054****	**-.038****	**-.061*****	**-0.051**	**-.085****	**-0.013**	**-0.002**	**-.033***	**-.051****	**-.020*****	**-.024*****
se	0.018	0.021	0.016	0.019	0.034	0.041	0.085	0.085	0.017	0.020	0.007	0.008
p	0.053	0.011	0.016	0.001	0.130	0.039	0.875	0.982	0.056	0.013	0.004	0.001
0	**-.184*****	**-.849*****	**-.185*****	**-.741*****	**-.190*****	**-.346*****	**-0.039**	**-0.120**	**-.174*****	**-.798*****	**-.041*****	**-.310*****
se	0.026	0.039	0.023	0.033	0.042	0.045	0.083	0.100	0.025	0.038	0.008	0.015
p	0.000	0.000	0.000	0.000	0.000	0.000	0.642	0.231	0.000	0.000	0.000	0.000
1	**-.135*****	**-.172*****	**-.153*****	**-.184*****	**-.215*****	**-.226*****	**0.017**	**0.014**	**-.125*****	**-.159*****	**-.032*****	**-.044*****
se	0.025	0.027	0.022	0.024	0.050	0.051	0.074	0.077	0.023	0.026	0.008	0.009
p	0.000	0.000	0.000	0.000	0.000	0.000	0.820	0.858	0.000	0.000	0.000	0.000
2	**-.080*****	**-.134*****	**-.081*****	**-.147*****	**-.092****	**-.196*****	**0.033**	**-0.003**	**-.072*****	**-.125*****	**-0.010**	**-.041*****
se	0.023	0.027	0.020	0.025	0.044	0.060	0.075	0.090	0.022	0.026	0.009	0.011
p	0.000	0.000	0.000	0.000	0.039	0.001	0.664	0.975	0.001	0.000	0.225	0.000
3	**-.066*****	**-.092*****	**-.070*****	**-.099*****	**-.089****	**-.128****	**0.030**	**0.048**	**-.060*****	**-.083*****	**-0.003**	**-.025****
se	0.024	0.029	0.021	0.026	0.044	0.059	0.075	0.075	0.023	0.027	0.009	0.012
p	0.006	0.002	0.001	0.000	0.046	0.031	0.695	0.521	0.008	0.002	0.725	0.031
4	**-.044****	**-.071****	**-.062*****	**-.095*****	**-.133****	**-.186*****	**0.011**	**0.027**	**-.043***	**-.066****	**-0.012**	**-0.015**
se	0.023	0.030	0.022	0.028	0.057	0.068	0.091	0.092	0.022	0.028	0.012	0.014
p	0.049	0.018	0.004	0.001	0.020	0.006	0.906	0.773	0.052	0.020	0.344	0.297
5	**-.053****	**-.050***	**-.064****	**-.077*****	**-.109***	**-.178****	**0.037**	**0.066**	**-.050***	**-0.044**	**0.001**	**0.013**
se	0.027	0.030	0.025	0.030	0.061	0.080	0.091	0.090	0.026	0.029	0.013	0.016
p	0.049	0.098	0.010	0.010	0.074	0.027	0.683	0.465	0.054	0.127	0.915	0.412
6	**-.055***	**-.066***	**-.068****	**-.085****	**-.124***	**-.153***	**0.065**	**0.031**	**-0.049**	**-.062***	**0.008**	**0.021**
se	0.033	0.039	0.030	0.036	0.067	0.082	0.100	0.139	0.031	0.037	0.016	0.020
p	0.095	0.088	0.021	0.017	0.063	0.063	0.517	0.822	0.116	0.098	0.635	0.296
7	**-0.002**	**-0.036**	**-0.014**	**-0.049**	**-0.062**	**-0.085**	**0.123**	**.163****	**0.005**	**-0.019**	**0.013**	**.060****
se	0.039	0.048	0.035	0.043	0.068	0.083	0.077	0.082	0.036	0.044	0.023	0.028
p	0.968	0.455	0.695	0.261	0.360	0.306	0.110	0.046	0.888	0.657	0.585	0.030
Prob.>F	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Observ.	130816	130816	133098	133098	124754	124754	123116	123116	131460	131460	125930	125930
Workers	9344	9344	9507	9507	8911	8911	8794	8794	9390	9390	8995	8995

Table A.3 Notes: Standard errors are robust to residuals that are not identically distributed and to observations that are independent across groups (individuals) but not necessarily independent within groups.

A.4) Relevant Italian Labor Market Institutions

Labor market Italian institutions such the "passive" CIG (Cassa Integrazione Ordinaria) and CIGS (Cassa Integrazione Straordinaria) policies were already in place in 1985. Therefore we decided to introduce in our specification also a dummy indicating this temporary period of subsidization to industrial workers that are temporarily unemployed (but formally employed). Both subsidies have a wage replacement rate of 80% and benefit from it industrial workers (CIGS also covers retail and some services' firms); however the duration of CIG is shorter (3 months) than that of CIGS (up to 3 years during a period of five years). The last difference is that only workers employed in firms in bad economic situations with a minimum of 3 months of tenure are entitled for CIGS, whereas CIG have no other special restrictions. Moreover, workers displaced in collective redundancies (ex Law num.223/1991) and eligible for CIGS benefit from a (also additional to CIGS) subsidy with a 80% wage replacement ratio for a maximum period of one year. All workers displaced in collective redundancies, included those not eligible for CIGS, are registered in a list of mobility, an institution aimed to facilitate the search process for a new job (e.g.: employer incentives to hire listed workers, plans of professional qualification and temporary social works). The ordinary unemployment benefit scheme is instead quite limited. It offers a low replacement rate (7,5% in 1985, 30% in 1995; source: Bertola, Boeri Cazes, ILO, 1999) and lasts 6 months (to be eligible two year of contributions are necessary).

Active labor market policies aimed at re-training or resolve mis-match problems between supply and demand (such as: the employment service, training programs, youth measures, subsidized employment) were weak if compared to the other European countries. The Public Employment Service activities were, traditionally, simply limited to maintaining lists of registered unemployed as the basis to grant facilitations for hiring by large firms and the public sector. Therefore, placement services were not the focus of these placement offices. The literature suggests that the effectiveness of active labor market measures in preventing from unemployment is confined to not vast in scope policies and well targeted to specific local demand-offer needs (i.e., to the heterogeneous needs of both workers and employers in local labor markets). They ranged from the "Contratti di formazione lavoro", job training schemes especially directed to the young (whose

training content and job career enhancing power is very doubtful[33]), to public creation of "socially useful" jobs ("Lavori socialmente utili") for the long-term unemployed and the never-employed and the introduction of "Contratti di reinserimento", tax and social charges rebates, for the long-term unemployed.

Italian employment protection legislation is reviewed in detail by Bertola and Ichino (1995). The regulation of job-displacement is, according to OECD's studies, particularly strict with respect prevailing standard of and penalties for unfair dismissals. Table A.4 shows that during the first half of the period covered by the INPS sample unmotivated dismissals by commercial enterprises with more than 15 employees is sanctioned with the reinstatement of the unduly laid-off employees and with a due compensation of at least five months pay. In 1990 small firms became subject to the provisions of law 15/07/1966, nr. 604: the employer can choose if re-hire or compensate the unduly sacked employee. Moreover with the same law (law11/05/1990, nr.108), the unduly laid-off employee has additionally the right to choose to be compensated (with 15 monthly payments) rather than reinstate. However, according to Bertola and Garibaldi (2002), "employment protection was somewhat weakened by labor courts' less restrictive interpretation of justifiable dismissals and, especially, by the collective redundancy procedures introduced in 1991".

Although in Italy collective bargaining is often seen as the preponderant determinant of wage, the Italian industrial relations schemes have many other potential driving forces of wage determination (see Erickson and Ichino, 1993). Firstly, bargaining takes place at the national, industry and firm level. Moreover, variation in wages across industries and across firms in the same industry can happen also through a different positioning of workers in the rank-ladder (with respect the nature of the occupation of the worker).

[33] According to Bertola and Garibaldi (2002), the "Contratti di formazione lavoro", that have a fixed duration and are associated to a payroll tax cut, should be interpreted more practically as contracts facilitating temporary hires. Moreover, according to Rettore and Trivellato (2002), many subsidized hirings would have happened also in the counterfactual situation of absence of financial incentives.

INDIVIDUAL DISMISSALS						
	Definition of unfair dismissal	**Notice period**	**Severance pay**	**Procedural obligations**	**Sanctions**	**Exemptions**
Law 15/7/1966, nr. 604	It is considered unfair a dismissal made without "just cause" (giusta causa) or "justified subjective and objective reason" (giustificato motivo soggettivo e oggettivo) [1]. In any case, it is considered unfair the discriminatory dismissal, which is caused by reasons of political credo or religious faith and by belonging to a trade union.	The notice is due only to an employee dismissed for "justified reason", not for "just cause".		The dismissal is to be communicated to the employee in written form; the employee can require a written communication of the reasons.	Re-employment *or* compensation [2].	The Act (and the relevant limitations on the employer's freedom to dismiss) applies only to company employing more than 35 people.
Law 20/5/1970, nr. 300: art. 18 (Workers' Statute)	It is a discriminatory dismissal also a dismissal caused by reasons of sex, race, and language.				Reinstatement *and* compensation equal to at least 5 months pay.[3]	Workers' Statute: only for employers (of commercial companies) with more than 15 employees in the same production unit.
Law 29/5/1982, nr. 297			[Annual salary/13,5] per year of service [4]			
At present (law 11/5/1990, nr. 108 and collective agreement)		The notice period is fixed by collective agreements: blue collar: 2 days of notice is required when length of service is below 2 weeks and 6 to 12 days thereafter; white collar: 8 days of notice is required when length of service is below 8 weeks and 15 days to 4 months thereafter.			For dismissal without "just cause" or "justified reasons"[5]: for employers (of both commercial and non-commercial organisations) with more than 15 employees (5 for farms) in the same production unit or same locality and, anyway, for employers with 60 employees in his staff (even if distributed in production units or localities with less than 16-6 in agricolture-employees): reinstatement *and* compensation equal to at least 5 months pay. Besides the employee has the right to choose to compensate (15 monthly payments) rather than reinstate. The employee can (optional) request the conciliation through the Provincial Labour Office or the trade unions; often: agreement; if court:	For employers with less than 16 employees (6 for farms): re-employment *or* compensation equal to 2.5-14 months pay [7]. There is the obligation to an extrajudicial attempt of a conciliation through the Provincial Labour Office or the Trade unions; if the attempt is unsuccessful, the parties can turn to a college of arbitrators.

					always reinstatement [6]. For formal reasons and for discriminatory dismissal: reinstatement *and* compensation; conciliation not possible.	

(1) The justified subjective reason is when the employee runs into a considerable non-fulfilment of contractual obligations; the "just cause", which is also to be referred to the employee's non-fulfilment as the "justified subjective reason", differs from it only for the particular gravity, which is such as not to allow the continuation, not even temporary, of the employer-employee relationship (art. 2119 civil code and jurisprudence); the "justified objective reason" is when there are reasons concerning the productive activity, the labour organization and its regular functioning.
(2) The employers can choose between the re-employment and the compensation.
(3) The employer must reinstate the employee and also pay a compensation, proportionate to the total salary and in any case not less than 5 monthly payments, as compensation for the damage for the period between the dismissal and the reinstatement. There is not the possibility of choice as in the past and the reinstatement is different from the re-employment: the first involves the payment of the compensation for the period between the dismissal and the reinstatement.
(4) The severance pay (trattamento di fine rapporto) is paid to all workers, in any case of separation and it is not considered a help for re-employment.
(5) Rules of law 604/1966 extended to small firms; rules of Workers' Statute for the others.
(6) Generally employers and employees do not turn to the court, but they come to an agreement through the Provincial Labour Office or the trade unions. Following a court judgement of unfair dismissal, the employee has always the option of reinstatement.
(7) They can choose between the re-employment and the compensation, to the unlawfully dismissed employee, for the suffered damage: the compensation is determined by the judge between a minimum and a maximum fixed by the law; he must take into consideration the number of employees, the corporate sizes and employee's seniority (so the compensation can vary from a minimum of 2,5 to a maximum of 6 monthly payments, but it can be increased to 10 or even 14 monthly payments).

SOURCE: G. Bertola, T. Boeri, S. Cazes (1999)

Table A.4. Individual dismissals

COLLECTIVE REDUNDANCIES[8]								
	Definition	**Exemptions**	**Procedural obligations**	**Sanctions**	**Notice period**	**Severance pay**	**Premium for agreement**	**Social plans**
1947-1991	Collective redundancies were regulated only by inter-union agreements (lay off after a reduction or conversion in business) and by jurisprudence (but it is contradictory).		Collective redundancies were subject to procedural limits, as the obligation to a consultation with the employee representations was imposed.					
Law 23/7/1991, nr. 223	The law nr. 223 fills the gap and it carries out the community directive 75/129, identifying two hypothesis of lay off: - collective redundancies: when the firm with more than 15 employees, after a reduction or conversion in business or work, wants to dismiss	Firms with less than 16 employees (rules of individual dismissal).	Obligation for the employers to a complex information and consultation with the trade union and the Provincial Labour Office (75 days) [9].	Reinstatement for the communication of the dismissal without written form, for the violation of the procedure (not only the lack of the information, but also an incomplete information cause the ineffectiveness of the dismissal) or	From 1 months to 12 months plus the time required for the consultations (up to 75 days).	The employees of the firms subject to the rules of the CIGS (cassa integrazione guadagni straordinaria, a sort of redundancy fund), dismissed *ex* law nr. 223, with a seniority of at least 12 months (6 of which of	The firms subject to the rules of the CIGS must pay to the SS a contribution equivalent to 6 times the compensation of mobility in case of placing of mobility and to 9 times in case of collective redundancies.	The employees of the firms subject to the rules of the CIGS, dismissed *ex* law nr. 223, besides benefiting by the compensation of mobility, are registered in the lists of mobility, with the possibility of taking advantage in the search for

	at least 5 employees in 120 days, in every establishment, or in more establishments in the territory of a same province and this lay off is in any case be referred to the same reduction or conversion; -placing in mobility: when the firm admitted to the redundancy fun thinks it cannot guarantee the reinstatement to all suspended employees and it cannot turn to alternative measures.			the rules of choice (the lack of the communication of the rules or the violation of the rules).		effective work) have the right to a compensation (the so-called compensation of mobility) [10] for a maximum period of 12 months, which can be increased to 24 for those aged 40 to 50 and to 36 for those over 50: for the first year the amount of the compensation equals the redundancy fun before the dismissal, then it is reduced to 80%. Severance pay (trattamento di fine rapporto): payable in addition.	For both cases it is reduced to 3 times, in case of collective agreement.	a new employment [11]. The employees of the firms excluded from CIGS, dismissed *ex* law nr. 223, have the only right to be registered in the lists of mobility, not the right to benefit by the compensation.

(8) Unlike other European countries, this is a subject different from the subject of individual dismissal.

(9) Obligation for the employers to an immediate information in written form to the trade unions and to the Provincial Labour Office. The communication to the trade unions and the public authority must contain the information on the reasons of the redundancies; on the technical, organizational or productive reasons which do not allow alternative measures; on the number and the professional position and profile of the employees; it must contain also the possible social measures planned by the firm. The employee representatives can require a joint study (esame congiunto) in order to consider the possibility of different use for these employees, also by "solidarity contracts" (see Table 4) and the flexibility of working time (the agreements are so motivated). If agreement is not reached within 45 days, the Provincial Labour Office will act as mediator (for 30 days). If agreement is not reached during this period, the dismissal may take place. The dismissal is to be communicated individually in written form; there is obligation to notice (from 1 month to 12 months) or the compensation, which is fixed by collective agreements; a list of the personal and professional data of the employees dismissed as well as the formalities of the enforcement of the rules of choice (if they are not fixed by collective agreements, they are: dependants, seniority and technical-productive and organizational needs; in the jurisprudence the last criterion prevails) is to be communicated in written form to the Regional Labour Office, to the Regional Employment Commissions and to the trade unions.

(10) This particular unemployment subsidy is different and more favourable than the unemployment subsidy due to the other unemployed. The other European countries instead have only an unemployment subsidy.

(11) There are plans of professional qualification, of temporary social works and of facility for employers who hire them. As the unemployment subsidies, also the measures to facilitate the search of a new employment are particular for the employees registered in the lists of mobility.

SOURCE: G. Bertola, T. Boeri, S. Cazes (1999)

Table A.5. Collective redundancies

A.5) Absence from the panel

Table A.6 reports the observed probabilities of absence from the INPS panel in a given year. These figures refer to the high tenure workers that during some years[34] are absent from the INPS archives, i.e. they exclude all workers that are present during all years in INPS panel (which were object of the econometric analysis).

Other movers have the lower unconditional probability of being out of the INPS panel as only-mass layoffs. Moreover ultimately displaced workers have a lower unconditional probability of being out of the INPS panel than other movers, whereas pre-closing separators have the highest one. However, once I take into account retirement, self-employment and quasi-dependent work (i.e., atypical job contracts), the three groups of displaced workers display an higher percentage of unexplained absence from the INPS panel (i.e., P(a $\cap$ no info)) than other movers.

	P (a)	P (retirement | a)	P (self employment | a)	P (atypical contract | a)	P (a $\cap$ no info)
Other movers	0.59	0.56	0.04	0.01	0.23
Ultimately displaced	0.51	0.35	0.08	0.01	0.29
Only-mass layoffs	0.59	0.41	0.08	0.01	0.30
Pre-closing separators	0.72	0.49	0.05	0.00	0.33
All workers	0.58	0.53	0.05	0.01	0.25

Table A.6) Observed probabilities of being absent from INPS private-dependent sector archives during a give year. P(a) means probability of absence from the panel during a given year.

The other possible causes of unexplained absence from the INPS panel are non-employment (unemployment or out of the labor force), agricultural or public sector employment and employment in shadow economy. Assuming that the probability of finding a job in the public or agricultural sectors is the same for all workers[35], these descriptive statistics would indicate that, during the years of absence from the INPS panel, displaced workers have an higher probability, with respect other movers, of being in a negative economic situation (non-employment or employment in the shadow economy). Therefore it is likely that my econometric estimates of the effect of displacement on workers' outcomes (and especially the results concerning employment prospects of displaced workers) are lower bound estimates. In other words, if one is willing to

[34] By construction all high tenure workers are present in the panel till 1992; therefore these probabilities refer to years 1993-1999.

[35] Moreover, according to Contini and Villosio (2006), such probabilities should be very low.

accept that non displaced workers have better labor market perspectives than displaced workers outside the private dependent sector, than it is possible to argue that the estimated losses of displaced workers with respect non-displaced workers that remain in the INPS panel (that are provided by this paper) are lower bound estimates of the true losses due to displacement experienced by high tenure workers during the nineties in Italy.

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